▶GROWING PAINS

Sprint pays steep rent on AT&T lines

BY PAM POWERS
Senior Editor

KANSAS CITY, Kan. — A staggering $1 million a day is the price US Sprint Communications Co. is paying in its struggle for success in the long-distance market, and that money is filling the pockets of its most formidable competitor, AT&T.

Since its inception as a joint venture between United Telecommunications, Inc. and GTE Corp. seven months

Profile of US Sprint Communications Co.

$1.141b revenue for six months
ended Dec. 31, 1986.

$356.6m earnings loss for six months
ended Dec. 31, 1986.

$589m 4Q 1986 revenue;
30% increase over previous year.*

$1m per day spent on AT&T leased lines.

28% reliance on AT&T leased lines.

33% business customers.

4.7 million total customers

2 million customers added since July 1, 1986.

* As compared with the combined 4Q 1985 revenue of predecessor units belonging to GTE Corp. and United Telecommunications, Inc.

NETWORK LINE

News

AT&T gears up its System 85 PBX with an ISDN interface and a variety of other enhancements. Page 2.

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Banyan servers form the foundation of the Bank of New England's PC network, which stretches from Maine to Connecticut. Page 2.

▼

Widening their product lines, NET and Doelz Networks join forces at the ComNet '87 show. Codex and Stratacom are also reported to have inked an OEM deal, but both firms are mum. Page 2.

The ISO's decision to embrace IBM's LU 6.2 prompts surprising applause from Big Blue's competitors and mixed feelings on the part of users. Page 4.

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A new kid on the block, Newbridge Networks, appears at the ComNet show to unveil a pair of low-cost data switches for PC resource sharing. Page 5.

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Saying deregulation will improve the U.S. International trade picture, the National Telecommunications and Information Administration echoes the Justice Department's proposal to relax BOC restrictions. Page 6.

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▶ COMMUNICATION NETWORKS '87

Users, vendors fear deregulation

Users voice concerns over service quality.

BY BOB WALLACE
Senior Editor

WASHINGTON, D.C. — In their zeal to conquer markets now forbidden, the Bell operating companies will pursue business expansion at the expense of customer service, users said last week at the Communication Networks '87 conference here.

A study conducted at ComNet says users back deregulation but worry about the consequences. Page 5.

Users told *Network World* they fear deregulation of the BOCs will create turmoil in the long-distance service and equipment markets. User concern and confusion over deregulation were also evident

Long-haulers damn BOC freedom plan.

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — Visitors at last week's Communication Networks '87 show were treated to a rare sight, as long-distance rivals AT&T, MCI Communications Corp. and US Sprint Communications Co. banded together to lambaste the U.S. Department of Justice's plan to deregulate the Bell operating companies.

During ComNet's Town Meeting, AT&T President Robert Allen, MCI President Bert Roberts and US Sprint Vice-President John Hoffman spoke out against the Justice Department recommendation to U.S. District Court Judge Harold Greene that the BOCs be allowed into the long-distance, information services and equip-

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▶ USERS CHAMPIONED

INTUG stands global watch

BY MARY PETROSKY
West Coast Correspondent

LONDON — In the 12 years that the International Telecommunications Users Group (INTUG) has been chipping away at the obstacles hindering users of international networks, the group has won a number of important victories and has seen its influence grow steadily.

Founded in 1974, INTUG currently represents 13 user associations and roughly

30 large corporations in dealings with telecommunications providers like the powerful national Postal Telephone and Telegraph administrations and international standards organizations such as the Consultative Committee on International Telephony and Telegraphy. Among its members are the International Communications Association (ICA) and the Tele-Communications Association (TCA), the European Association of Information Services, and

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FEATURE FOCUS

Network test equipment puts the finger on faulty lines

BY JOHN J. HUNTER
Contributing Writer

Problem? Problem? Who's got the problem? Not me, said the carrier. Not me, said the DCE. Not me, said the DTE. Then it must be me, said the communications manager.

By now, most managers are tired of

ferreting out what is responsible for communications problems. But such determinations must be made, and hiding one's head in the sand is not the solution. The quicker the guilty party is pinpointed, the better.

When errors crop up in transmitted information, identifying the source of ☞See **Feature focus** page 34

NEWSPAPER

▶ COMNET '87

AT&T announces ISDN interface for System 85

BY BOB WALLACE
Senior Editor

WASHINGTON, D.C. — With an eye on the future, AT&T announced at the Communication Networks '87 conference here last week an ISDN interface for its top-of-the-line System 85 private branch exchange, and said it plans to support the interface in its public-switched network.

AT&T also used this annual blockbuster conference to introduce an array of System 85 products that included enhancements to its Automatic Call Distribution system, new switch management and administration capabilities, and a new messaging system.

The Primary Rate Interface/Digital Multiplexed Interface (PRI-DMI) is AT&T's implementation of the CCITT Primary Rate Interface specification. This standard defines how 1.54M bit/sec digital facilities will be used to connect business customers to future Integrated Services Digital Network services.

The Primary Rate Interface, also referred to as 23B+D, specifies how 1.54M bit/sec T-1-type facilities are segmented into 24 64K bit/sec digital channels. Of these, 23 are B channels used to support data and digitized voice signals, and the 24th D channel carries signaling information used to set up voice and/or data calls and to control those channels.

PRI-DMI is an outgrowth of AT&T's current Digital Multiplexed Interface, which was introduced in 1984 as a method to tie PBXs to host computers. The PRI signaling technique has been incorporated into the technically similar DMI interface.

Jack Bucter, vice-president of product management and business development for AT&T's Business Markets Group, said AT&T scheduled internal trials of PRI-DMI to begin this fall in Denver, Newark, N.J., and Jacksonville, Fla.

The trials will test the ability of AT&T's System 85 outfitted with the new PRI-DMI software to support the CCITT Q.931 D-channel signaling protocol. This protocol standard defines how customer switches communicate signaling information to ISDN-compatible telephone company equipment to control the characteristics and routing instructions of the 23 B channels.

Rick Simonson, ISDN service marketing manager for AT&T's Business Markets Group, said if the internal tests are successful, a user field test of the System 85 software will begin in December. He would not reveal the name of the expected participant. Simonson did say, however, that the company would run a telemarketing application.

The PRI-DMI interface, which AT&T claimed will be available in December, costs $35,000 for current System 85 users.

Other System 85 enhancements include:

■ Enhancements to AT&T's Automatic Call Distribution (ACD) package, including additional management report generation and administrative capabilities through the 3B Call Management System, and more sophisticated incoming call routing.

■ Visual Maintenance and Administration Panel (VMAAP), a menu-driven Unix PC-based application system management tool that helps users administer up to four switches in Electronic Tandem Networks, including the ability to administer station adds, moves and changes.

▶ PC NETWORKS

Bank builds on token-ring foundation
Bank of New England's 300-user net slated to double this year.

BY PAULA MUSICH
Senior Editor

BOSTON — A year and a half ago, the Bank of New England made a strategic decision to build its end-user computing efforts on a foundation of networked personal computers. Today, the bank's network employs 15 Banyan Systems, Inc. servers supporting roughly 300 users at locations throughout New England — and that network is expected to double in size this year alone.

Some 15 Bank of New England sites from Maine to Hartford, Conn., are internetworked. Five remote sites have their own servers. The other remote users have dial-in access to nearby servers. "Once a user dials in, they're like any other user on the network — only a little slower," said Jonathan Oski, office systems analyst for the bank and chief network administrator. Remote sites use 2,400 bit/sec modems to dial in to servers.

Three Banyan servers are configured with SNA 3270 gateway capabilities. This software option provides IBM 3274 cluster controller emulation and makes from 32 to 96 logical units available to personal computers emulating 3278 terminals. The logical units are assign-

▶ IBM

3174 gets Token boost

NEW YORK — IBM will announce Token-Ring Network compatibility for the local version of its 3174 display controller at a press briefing here Tuesday during which a slew of terminals will also be introduced, sources said.

IBM has only offered Token-Ring support for two of its six 3174 models configured for remote use, meaning they are polled devices. The 3174 1L is the only local controller in the 9-month-old product line that was launched as a replacement to the old 3274 workhorses.

Local controllers are channel-attached to host processors and are interrupt-driven, meaning they can initiate a connection with a host when they have data to transmit instead of waiting to be polled. Token-Ring support from local controllers will ease the polling bottleneck, according to analysts.

Terminals expected to be announced include the 3192, a monochrome version of the color 3194, which has local diskette storage for record/playback of key sequences that simplify repetitive tasks. ⧉

▶ INDUSTRY EVOLUTION

Users at ComNet show seek full system offerings
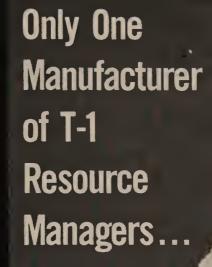
BY PAUL KORZENIOWSKI
Senior Editor

WASHINGTON, D.C. — Signs of a fundamental shift in the data communications industry, marked by movement away from component sales toward integrated systems offerings, were in evidence at last week's Communication Networks '87 conference here.

Users stalked the conference exhibit hall looking for vendors that can supply all the pieces of the network puzzle. Vendors scrambled to round out their product lines from stand-alone components to complete, integrated network systems. Demonstrating that were two major joint marketing deals — one unannounced — involving top players in the data communications field.

According to ComNet's sponsor, approximately 17,000 people attended the show, an increase from

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▶ USER VIEW: OSI/SNA

Users mixed on ISO support of LU 6.2

Protocol's effect on peer-to-peer links said distant.

BY BOB HAMEL
Senior Editor

The International Standards Organization's (ISO) recent decision to adopt subsets of IBM's network architecture into a draft standard has left users with mixed feelings. Some users told *Network World* the move may weaken the overall effort to draft a nonproprietary architecture for interconnectivity, while others said it may speed the standards-making process.

Herbert Bernstein, a senior research scientist at the Courant Institute of Mathematics and Science at New York University, considers ISO's adoption of LU 6.2 a reasonable step, but cautions against having a multiplicity of specifications in the same area.

He is concerned that the OSI model will eventually "end up as a collection of alternative methods. That doesn't constitute a standard," he said.

"We seem to be headed in the unfortunate direction of having lots of supposed standard implementations which are incompatible," Bernstein noted. He likened the process to "having a standard for light bulbs that says some can be right-hand screw and some can be left-hand screw."

Kent England, manager of network and system engineering at Boston University, said he follows ISO closely and is eagerly awaiting "common, high-level protocols that will allow us to link our systems together in the future." He said he believes practical implementation of the OSI model is at least three years away.

England cautions against sacrificing functionality for standards. "If I can't duplicate the functionality of [Advanced Research Project Agency] protocols with OSI, I won't be inclined to adopt them." ARPA protocols were originally designed for the Department of Defense and are still widely used by many institutions. "I wouldn't give up functionality just to conform to standards," England said.

Ed Hodgson, manager of computing and communications for Westinghouse Electric Corp., said he has adopted a wait and see attitude toward ISO's decision. "Everyone talks a lot about LU 6.2, but no one does much about it," he said. "LU 6.2 may give us the ability to do peer-to-peer data transfer, and that will be an advantage. But don't expect to see the full benefits of the protocol for at least a couple of years."

Corporations have large investments in equipment and applications that are not LU 6.2 compatible, Hodgson said. "It's going to be a while before we opt to replace what we have."

According to Dan Lynch, president of Advanced Computing Environments, a Cupertino, Calif.-based training concern specializing in networking issues, the incorporation of LU 6.2 "adds a very rich capability, provided we can figure out how to use it."

In Lynch's estimation, LU 6.2 is necessary to get computer systems to work on a peer-to-peer level. "You can't build on a zero foundation. LU 6.2 gives us a foundation to build interesting applications." Lynch considers it a step toward true distributed computing.

John Coman, manager of computing and telecommunications for ARCO Oil and Gas Co., said he sees ISO support of LU 6.2 as a step toward developing a fully supportable program-to-program interface. However, he cautioned that "OSI is a model of the way things should work, not a reality. SNA is the de facto standard."

Bill Hartmann, a senior consultant with Arthur D. Little, Inc., considers the announcement as potentially "making IBM's life in international markets a bit easier." Hartmann supports the development, indicating that, for most users, "the closer OSI and SNA are, the better." ◪

▶ VENDOR VIEW

IBM rivals applaud ISO acceptance of LU 6.2

BY PAM POWERS
Senior Editor

Surprisingly, most of IBM's large-systems competitors applaud the International Standards Organization's (ISO) recent decision to incorporate a subset of Big Blue's LU 6.2 protocol into a draft Open Systems Interconnect (OSI) standard.

After earlier rejecting LU 6.2 as a candidate for inclusion in the OSI model, the ISO embraced a portion of the protocol last month. Some industry observers decried the action, saying ISO's acceptance of the IBM protocol would give IBM unfair leverage in the development of international standards.

But IBM's biggest competitors, such as Digital Equipment Corp., Wang Laboratories, Inc., Hewlett-Packard Co. and others, told *Network World* they are enthusiastic about ISO acceptance of LU 6.2.

"From our position, it's a very positive move," said J.J. Cinecoe, senior product manager for OSI networks with Lowell, Mass.-based Wang. "We're already working on LU 6.2 and hope to develop a common set of verbs or interfaces which a customer can use to address the SNA or OSI environment. This would move us a step closer."

Elaine Bonham, OSI network product manager with HP, agreed that adoption of LU 6.2 would accelerate the standards-making process. "It would save a lot of groundwork if the ISO were to accept LU 6.2. IBM has put a lot of work into the protocol. Why start all over again?" she asked.

The acceptance of LU 6.2 into the OSI model presages an eventual merging of Systems Network Architecture and OSI architectures, according to Joe Fortioni, group manager of communications product marketing at Data General Corp. of Westborough, Mass. "ISO's action is positive for us because our long-term strategy is to support both architectures," he said.

While Cinecoe approved of ISO's decision and said Wang hoped the standards body would move quickly in adopting the protocol, he pointed to a common concern among vendors. "The whole concept of OSI is to have a neutral set of standards not tied to any large vendors. It appears that, this time around, IBM understands that issue, but that hasn't always been the case."

ISO's earlier reluctance to accept LU 6.2 was reportedly grounded in IBM's insistence that it retain ownership of the protocol and that LU 6.2 be accepted in its entirety. That has changed. According to Sam Alunni, senior product manager for IBM connectivity with Apollo Computer, Inc. in Chelmsford, Mass., what has more recently changed the nature of the game is IBM's introduction of the application program interface as a subset of LU 6.2. "In the past, the only way ISO could get this interface was by using all of LU 6.2. They didn't want IBM to get a lock on application-to-application communications. But now that interface can be used independently, so ISO is interested."

Alunni said Apollo looks favorably on LU 6.2's acceptance in the light of this modification, but other vendors expressed continued uneasiness over IBM's role in international standards-making.

"At the moment, we're not comfortable with IBM's stance as regards ownership. Who will control the future of the standard?" asked Andrew Poupart, OSI product manager for Tandem Computers, Inc. Poupart said the addition of transaction processing capability to the OSI model was badly needed, and LU 6.2 was one obvious answer.

"But we're evaluating other proposals as well. Some proposals go further than LU 6.2 in terms of generalized transaction processing." ◪

▶ COMNET SURVEY

Users back deregulation, but warily

BY BOB WALLACE
Senior Editor

WASHINGTON, D.C. — While users advocate continued deregulation of the communications industry, they are worried about how such regulatory relaxation will affect the quality and price of the equipment and services they use, according to a survey of 500 users at last week's Communication Networks '87 conference.

The survey, dubbed Signals '87 by sponsor Communications Satellite Corp. (COMSAT), also showed widespread user concern over purchasing, obstacles to network integration and network security.

Of the users polled, 71% said deregulation has spurred growth of the communications industry,

while 19% said deregulation had hindered expansion of the industry. Sixty-three percent, or roughly 330 users, said they favored additional deregulation of the industry, while only 18% of the users called for continued regulation.
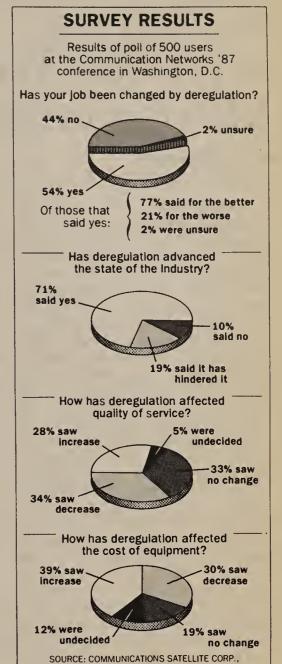
The survey results reflected user confusion concerning the ramifications of further industry deregulation. More than one-third of the users queried said further deregulation would reduce the quality of communications services, and nearly 40% said it would increase the cost of equipment. But almost 30% said they believed deregulation would increase service quality, and an equal number said it would lead to lower equipment prices.

John McQuillan, president of

McQuillan Consulting, a Cambridge, Mass.-based communications research and consulting firm, said Signals '87 represented a strong endorsement of further deregulation. He added, however, that users may favor deregulation simply for the sake of change. "I am amused that users think deregulation is good, but they can't determine whether or not such action would improve the quality or lessen the cost of equipment and services," he remarked.

Asked to name their largest single concern regarding the purchase of communications systems, roughly 33% of the users listed reliability as their chief worry, 31% identified incompatibility of different vendors' gear as their top concern and 14% said price headed their worry list.

When asked to identify the single largest stumbling block to integrated voice and data communications systems, 33% cited lack of uniform standards for these systems, 24% of the surveyed users listed general ignorance of the problem and roughly 15% claimed the absence of clear vendor system integration strategies was the key

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SURVEY RESULTS

Results of poll of 500 users at the Communication Networks '87 conference in Washington, D.C.

Has your job been changed by deregulation?

44% no
2% unsure
54% yes
Of those that said yes:
77% said for the better
21% for the worse
2% were unsure

Has deregulation advanced the state of the industry?

71% said yes
10% said no
19% said it has hindered it

How has deregulation affected quality of service?

28% saw increase
5% were undecided
33% saw no change
34% saw decrease

How has deregulation affected the cost of equipment?

39% saw increase
30% saw decrease
12% were undecided
19% saw no change

SOURCE: COMMUNICATIONS SATELLITE CORP., WASHINGTON, D.C.

▶ PC DATA SHARING

Newbridge Networks unveils low-cost switches

BY PAULA MUSICH
Senior Editor

WASHINGTON, D.C. — Newbridge Networks, Inc., a start-up formed by Mitel Corp. founder and Chairman Terry Matthews, unveiled at last week's Communication Networks '87 conference two low-cost data switches designed to provide peripheral and data sharing for personal computers.

The data switches are the first in a series of products that will be introduced this year by the Ottawa-based start-up. Newbridge Networks' 1032 Mainstream Data Controller is a nonblocking circuit switch that can support up to 48 RS-232 connections between personal computers, serial printers, modems and other devices. It supports asynchronous transmission at data rates from 50 bit/sec to 19.2K bit/sec. An eight-port version of the controller, the 1008, was also announced. Both switches can be daisy-chained to support more users.

The company also announced Easy Street Communications software, a random-access memory-resident utility for IBM Personal Computers with PC-DOS 2.0 or newer versions of the operating system. The program enables a user to establish a session with another Personal Computer user through the Newbridge controller. With the software, a user can perform file transfer functions or browse through files stored in a second user's drive. Access to files can be limited with passwords.

The products are designed for smaller businesses that only do desktop level processing, Matthews said.

"We're after a market segment that's not well addressed — the

typical business user who has a voice PBX with up to 100 lines, but has, for the most part, ignored data connections." Matthews is targeting firms that only need to connect personal computers, not minicomputers, for sharing slower peripherals and sharing small files and electronic mail messages.

Ian Angus, president of telecommunications consulting firm Angus TeleManagement Group in Toronto, believes that the price and capabilities of the switch should make it competitive with low-cost personal computer networks. Angus is a beta test user of the 1008 Mainstreet switch and companion Easystreet software.

"Most PC LANs are just used to share peripherals," Angus said. "The high-speed networks are massive overkill for this," he said. "It's very cheap and very functional," he said of the Newbridge switch.

Angus believes that Newbridge was able to price the switches lower than traditional data private branch exchanges because the devices rely on the intelligence of the personal computer. Traditional data switches connect dumb terminals.

He also feels its ease of use will be a strong selling point. "It's extremely simple to use, although a little tricky to set up. The user that installs it should understand RS-232 connections and be able to do some troubleshooting," he said.

The 1032 is priced at $1,850 for a base unit, which includes one eight-port card, cabinet, power supply and software. Additional RS-232 cards are priced at $740 each. The 1008 is priced at $1,099.

Matthews, who is the second largest shareholder at Mitel, founded Newbridge in March 1986 with $6 million in start-up funding. ∎

▶ MFJ UNDER SIEGE

NTIA recommends BOC restrictions be lifted to brighten US trade picture

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — The National Telecommunications and Information Administration (NTIA) last week called for removal of Modified Final Judgment restrictions on the Bell operating companies as a means of improving the U.S.'s international trade position.

The NTIA, a branch of the Department of Commerce, added its voice to the Department of Justice's in recommending that the BOCs be allowed to enter the long-distance, information services and equipment manufacturing markets, from which they are now prohibited by the Modified Final Judgment.

The agency issued its recommendations at a press conference staged for the release of three reports on various facets of competition in the telecommunications industry. The studies outlined competition in the local exchange market, international telecommunications trade and the impact of state regulation on competition.

The reports will be submitted to U.S. District Court Judge Harold Greene, to be considered along with the Justice Department's recently released review of the Modified Final Judgment.

The NTIA's findings are based on information the agency gleaned from the BOCs and their competitors, long-distance carriers, users groups and various federal agencies.

NTIA Director Alfred Sikes said, "International competitiveness is crucial to the future of the American economy, and the telecommunications industry is central to our ability to compete abroad." Sikes concluded that removing "unneeded regulation" would enable American telecommunications firms to compete better with foreign firms.

Sikes recommended the government retain some regulatory control over the BOCs in order to prevent them from forming joint ventures with foreign telecommunications equipment manufacturers, such as central office switch makers. Such oversight would prevent foreign firms from gaining access to the U.S. market when the foreign partner's home market is closed to U.S. vendors.

The report on trade concluded that the greatest competitive benefits would accrue from allowing the BOCs into the information services business. The report said users currently get such services through equipment supplied by foreign manufacturers.

The NTIA said that allowing the BOCs into equipment manufacturing would have little impact on the nation's international trade picture during the remainder of this decade because the BOCs would have to set up manufacturing facilities. But in the long term, the agency said, significant advantages could be achieved as users buy from BOCs rather than foreign firms.

The NTIA was less clear on how BOC entry into the interexchange market would enhance the U.S.'s trade outlook. The agency said BOC entry into long distance could stimulate demand for switching and transmission equipment and strengthen the U.S. economy, but added that their entry could create a "rivalry between the BOCs and AT&T, which could harm their ability to compete against foreign companies."☑

▶ VENDOR ALLIANCE

Tandem, Boeing unveil plan for joint networking, manufacturing systems

Deal calls for hardware and software product integration.

BY MARY PETROSKY
West Coast Correspondent

CUPERTINO, Calif. — In a set of agreements announced last week, Tandem Computer, Inc. and Boeing Computer Services said they will work to integrate their hardware and software products to provide joint networking and manufacturing automation systems.

Tandem brings its fault-tolerant computers and networked system architecture to the match, while Boeing's strengths are in project management, design and development of application software, support and education.

The two companies are studying a number of application areas where they might develop products, including document handling, image processing, shop floor control and advanced cell control systems.

Boeing and Tandem will also be investigating products that "flesh out MAP and TOP," said Jerry Dusa, Tandem's director of marketing. The Manufacturing Automation Protocol addresses networking on the factory floor, while the Technical and Office Protocol — spearheaded by Boeing — addresses networking in office and technical environments.

The two companies will also be looking for opportunities to market existing products jointly. Tandem systems are often used in backbone nets to manage a company's network and to handle routing of data, Dusa said.

Tandem is looking to expand its current products along these same lines, placing an emphasis on network and data base control as areas in which the company can add value.

"Tandem system architecture is designed for the manufacturing environment. Boeing has done a lot of work also in automating the manufacturing area, mostly through our consulting organization, so we're exploring how we might integrate these products and services," said Sandford Vanderhyde, Boeing's manager of alliances.

Tandem sees Boeing as having "the size, critical mass and set of skills" needed to develop products that will have broad appeal across a number of different industries, Dusa said.

End users expect integration

Alliances between companies such as Boeing and Tandem have become more common in the past few years in response to the increased complexity of manufacturing and networking technology, both Dusa and Vanderhyde agreed.

"End users expect more and more integrated products," Dusa said.

"There are few single sources for such products, so alliances like this seem to be the only way to offer satisfactory solutions."

Tandem has formed such alliances with a number of other vendors, Boeing being the largest one to date, said Dusa. Boeing has entered into one other such agreement, according to a Boeing spokesman.☑

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barrier to achieving this goal. The remaining users said the lack of specific Integrated Services Digital Network standards, an Open Network Architecture and deregulation of the communications industry as the top impediments to integrating communications systems.

In Comsat's survey, nearly 40% of the surveyed users said they are primarily involved with telecommunications, 24% with data communications.

Another 12% of the respondents listed job title as manager of information systems.☑

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able to an individual or a group of users.

The network is implemented on IBM's Cabling System, using Type 1, 2 and 3 shielded and non-shielded twisted pair wire.

Each of the Banyan servers supports a mix of token ring personal computer networks from Proteon, Inc. (ProNET-10) and IBM.

Networking took off at the Boston-based bank for a number of reasons. "Upper management understands the benefits of office automation," Oski said. As a result, management has opened up the corporate coffers for the acquisition of end-user computing equipment.

In this environment, a large base of sophisticated personal computer users grew quickly. These users later turned to Data Services, which supports all of the personal computer applications at the bank, to get more out of their personal computers. "LAN connectivity was the next logical step for accessing other corporate data," Oski said.

"We wanted to provide end users with a multifunction workstation environment in which users could access IBM, DEC and Wang hosts without putting three terminals on each user's desk," Oski explained.

"We also wanted to offer users higher performance workstations at a lower cost," he continued. Because networking allows users to share expensive peripherals, Data Services could give users IBM Personal Computer ATs without equipping each machine with a hard disk, printer or modem. Each server supports a laser printer shared by all users assigned to that server.

Data Services also found that managing personal computer users was easier on a local network. "Software support is much easier to do over the network because you can do it from one location," Oski said. "We don't have to configure a data base for each person; we don't have to buy and support different communications programs, and we don't have to worry about hard disk users who don't do backup." The Banyan server does backups every night.

Bank of New England decided to standardize on Banyan's network servers primarily because the servers offer wide-area networking and gateway capabilities and because of Banyan's support of token-ring technology. They were also sold on the fact that a single vendor could provide and support all of these functions.

Although the network supports a ratio of 75 Proteon network interfaces to 25 IBM network interfaces, Data Services will phase out the use of Proteon in favor of IBM Token-Ring adapters because of security issues surrounding host access.

Oski explained that users are granted host access rights based on the address of a network adapter card. This address is set at the factory for IBM adapters, but it is possible for end users to change the address on Proteon adapters. Proteon adapters enable a user to go to any station and access a host. "The IBM boards give us better control over where updates happen," Oski said.

BOC freedom from **page 1**
ment manufacturing businesses.

Both men said they felt betrayed by the department, which entered into the consent decree with AT&T in 1982 and now appears ready to abandon basic tenets of the agreement.

The two company heads were joined by a host of other conference participants who leveled harsh criticism against the Justice Department's recommendations and the so-called Huber report on which the proposals were based.

In contrast, officials from the Federal Communications Commission and the Bell companies showered praise on the Justice Department for its work. Both FCC Commissioner Mimi Weyforth

Dawson and FCC Common Carrier Bureau Chief Albert Halprin claimed that granting the BOCs entry to new markets will benefit the public. But users, service providers and equipment vendors seem to believe otherwise.

MCI's Roberts launched into a vitriolic attack on the Justice Department's proposal to abandon some of the basic notions of the Modified Final Judgment and against the FCC for not supporting it. Roberts expressed his company's "frustration with the ideological leadership of FCC Chairman Mark Fowler, who has driven the interexchange industry to the brink of financial disaster."

"Unfortunately, the FCC's failings were upstaged last week with

something I had not thought possible until I read the DOJ report," Roberts said. "The DOJ flip-flopped completely on the need for anticompetitive safeguards. The American public should be outraged at the DOJ recommendations, which are an example of special interest and high-pressure politics at their worst."

US Sprint's Hoffman questioned the Justice Department's assumption that nonstructural safeguards — as opposed to structural safeguards, which called for the BOCs to maintain separate subsidiaries — will be adequate to police BOC activities in new business arenas. "The safeguards for network design and cost accounting are not even in place yet. They have not

been put to the test, but the DOJ assumes they will work," said Hoffman. "I have serious concerns with this."

AT&T's Allen said the Justice Department's recommendations "risk a return to the turbulent, litigious marketplace of yesteryear, which would ill serve customers, investors and industry employees. And in the bargain we may well hurt, rather than help, U.S. competitiveness.

"The local exchange monopoly remains," Allen said. "It's not that conditions in the telecommunications industry have so changed that the consent decree principles no longer apply. Rather, the DOJ simply appears to be disregarding those principles."

Charles Rule, deputy assistant attorney general, Antitrust Division of the Department of Justice, disagreed with Allen. Rule said that according to the Modified Final Judgment, the local monopoly "doesn't have to disappear before the BOCs are allowed into new areas. The question is whether the BOCs can use that bottleneck to command market dominance, and we feel that they no longer possess that ability."

"Regulation has proven costly to society," Rule added. "We're not saying that total deregulation is the answer or that the BOCs should be allowed into new markets without some degree of regulation. But excessive regulation poses a threat to [affordable telephone] rates and universal service."

In his first public appearance since his report was released, Justice Department consultant Peter Huber elaborated on some of the points outlined in his 1,000-page report. Regarding equipment manufacturing, Huber said, "I can't see any BOC going out and knocking AT&T, Bell Canada, IBM or any other equipment industry heavyweight out of the market. This isn't territory that can be easily remonopolized."

In the area of information services, Huber noted that the public network is no more "feature rich" than it was in 1956 and suggested that regulation was hampering the introduction of enhanced services to the public switched network.

The FCC's Halprin praised Huber, saying he had done the most comprehensive study to date of the telecommunications industry. Halprin also expressed his support for the Justice Department recommendations.

According to Halprin, fear of BOC dominance in information services and long-distance businesses may be unfounded in light of the BOCs' inability to dominate any of the markets they have been permitted to enter since divestiture. He cited the BOCs' questionable success in the customer premises equipment business as an example.

Written comments about the Justice Department proposals must be received by Judge Greene by March 13. The Justice Department, AT&T and others will be able to file responses to the first round of comments by April 6. Replies to those responses are due April 20.∎

INDUSTRY UPDATE

BOCs' foreign forays contested

The National Telecommunications and Information Administration is lobbying to prevent the Bell operating companies from forming joint ventures with central-office switch vendors based in countries that discriminate against U.S. imports. The Justice Department recently recommended greater freedom for the BOCs in a move that would surely spark an increase of such ventures. NEC Corp. of Japan and Siemens AG of West Germany are two companies likely to profit from the BOCs' forays into the central-office switch market.

RBHC Expansiveness

Company	Office equipment, computer sales, service and maintenance
Ameritech	No plans
Bell Atlantic Corp.	W - Approved A - Compushop, Inc. A - Sorbus, Inc. A - MAI Canada, Ltd. A - Computer Maintenance Leasing Corp. A - Electronic Service Specialists, Inc.
BellSouth Corp.	S - BellSouth Advanced Systems, Inc. W - Approved A - Dataserv, Inc.
Nynex Corp.	S - Nynex Business Centers W - Approved A - IBM product centers A - Portion Sonecor Systems W - Pending - retail sales outlets
Pacific Telesis Group	W - Approved S - Pactel Information Systems A - Byte shops
Southwestern Bell Corp.	W - Approved S - Southwestern Bell Telecommunications, Inc.
US West, Inc.	S - US West Information Systems W - Approved

S = Subsidiary   A = Acquisition   W = Modified Final Judgment Waiver

SOURCE: DEAN WITTER REYNOLDS, INC.

► ACQUISITION ATTEMPT

Atlantic seeks to dodge buy-out bid

Clabir Corp. threat meets active opposition.

BY PAM POWERS
Senior Editor

ALEXANDRIA, Va. — Atlantic Research Corp. is trying to stave off an unfriendly takeover attempt while it prepares for what it calls a major announcement of test and diagnostic equipment in March.

Since early December, Clabir Corp. of Greenwich, Conn., has been buying up stock in Atlantic Research, a security systems and data communications equipment vendor. Clabir currently owns more than 13% of the company. Last week, the defense contractor proposed acquiring Atlantic Research for $274 million. Officials of Atlantic Research said they are committed to keeping the company independent and have sought the aid of First Boston Corp. and a major Wall Street law firm in an effort to fend off the proposal.

Two weeks ago, Atlantic Research acquired ORI Group, a professional services company based in Rockville, Md., in what was generally seen as an antitakeover move. Acquisition of ORI will raise the value of Atlantic Research's outstanding shares, thereby upping its own purchase price. Clabir retaliated by filing a protest against the ORI acquisition with the Securities and Exchange Commission. Neither company will comment as to the possible outcome, but Atlantic's ORI acquisition suggests it may have the financial strength to keep its pursuer at bay.

Clabir is the full owner of General Defense Corp., a military defense contractor, and as such is interested primarily in Atlantic Research's large defense business. Over 55% of Atlantic's annual revenue is derived from sales of rocket propulsion gear, and another 24% is generated by sales of security systems and services.

BRIEFS

Excelan, Inc. has filed a registration statement with the Securities and Exchange Commission for an initial public offering of 1,800,000 shares of common stock. The offering is comanaged by Alex. Brown & Sons, Inc. and L.F. Rothschild, Unterberg, Towbin Holdings, Inc.

$

GTE Communication Systems Corp. and **US West Materiel Resources** signed a general purchase agreement. The agreement makes it possible for three US West Information Distribution Companies to make major purchases from GTE Communication Systems on a regular basis.

$

Bridge Communications, Inc., a manufacturer of local-area network system products, announced net revenue and net income for the fourth quarter of 1986 and the year ended Jan. 3, 1987.

Net revenue for the year 1986 reached $46,180,000, while net income for the year reached $5,065,000.

$

Tellabs, Inc., a designer and manufacturer of voice and data communications equipment, announced record sales for the

INDUSTRY EYE
JAMES PALMER

Getting matrix without the mess

New advances in very large scale integration (VLSI) technology have made possible the design of a true circuit switch that provides the advantages of matrix switching without the usual accompanying problems.

In the past, technology and economics limited modern network control systems to only two techniques for test access and system reconfiguration. Manual technology-control systems use metallic contacts for switching and patching data communications channels. Some semiautomatic systems can be remotely controlled, but they are usually limited to relatively simple switching functions like front-end substitution.

The continuing search for a better way to deal with multiwire interfaces led to the development of the so-called virtual matrix switch. These de-

Palmer is president of Telenex Corp., located in Mt. Laurel, N.J.

vices rely on time-division multiplexing to avoid the otherwise large number of metallic contacts required for complete interconnection among numerous multiwire interfaces. They operate by combining the signals from many such interfaces onto a single multiwire bus. The bus connects two interfaces for a preassigned limited time interval and then keeps connecting two more until all desired connections are made.

Since the actual connection between any pair of interfaces exists only for a very short time, it is necessary to store the condition of each lead in each interface. This bridges the gaps produced by long periods when the bus is devoted to other interface pairs. It is further necessary to rotate the use of the common bus to all the interfaces at very high speed so that no rapidly changing signal on any interface is lost. All this complexity and speed results not only in high cost, but in performance limitations as well. The

failure of any equipment used to multiplex the common bus causes the whole switch to fail.

A true circuit switch avoids these problems, yet retains the fundamental economic advantages of multiplexing. The distributed architecture afforded by this technology allows the signal multiplexing to occur at the equipment interface of each line. Instead of combining the same signal from many interfaces onto each wire of a common multiwire bus, all the signals from one interface are combined onto only two wires, one in each direction. Those two wires are then connected to other two-wire interfaces in a normal, unmultiplexed, real (not virtual) switch.

This arrangement eliminates the complexity and performance limitations of the virtual matrix and the interdependency among channels so that one failure usually affects only one connection through the switch. Most importantly, the multiplexers that

Takeover from **page 9**

Atlantic sells a large portion of its security systems to the federal government.

Although the preponderance of Atlantic Research's revenue currently comes from defense contracts, the company has recently committed a lot of time and money to the development of data communications test equipment and network management systems. Company officials said that new products in those areas are scheduled to be announced the first week in March.

According to Lou Pace, vice-president of sales with Atlantic Research, the company has the largest installed base of test equipment and is widely recognized as "the protocol tester company." The company sells a broad line of patching equipment and hand-held test gear domestically and internationally.

"We have been struggling the past year or so to become more of a recognizable name in the network management arena," Pace noted. "We go well beyond simple test equipment to offering network management systems, but we aren't known for that yet."

Atlantic Research markets a line of modem-independent network management systems that work with a combination of networking configurations.

According to Tim Buckhholz, a senior marketing communications coordinator with the company, Atlantic Research's network manage-

ment systems compare favorably with its competitors in user ratings. Nonetheless, the company is comparatively unknown in that market, where it competes against more well-established vendors such as Dynatech Data Systems and Northern Telecom Inc.'s Spectron Division.

In addition to the planned product debuts, Pace said he recently hired 11 district sales managers to more effectively market the company's net management systems. "We are making a strong effort in several ways — through new products, product enhancements, advertising and by increasing our sales staff," Pace said. He would not elaborate on new product features or functions.

If Atlantic Research intends to make a name for itself in network management, a successful bid on Clabir's part might alter those plans. Clabir's two primary lines of business, defense and food products, suggest that Atlantic Research's communications division may flounder in the wake of a merger. Clabir was unavailable for comment, but in an earlier interview, a spokesman said the company would operate Atlantic as it now exists in its entirety.∎

Matrix from **page 9**

combine the interface signals with each other, called cable converter units (CCU), can be located near the equipment served (such as the front end, the terminal or the modem), and the cables that connect them to the switch then require only four wires instead of many (for example, 25 for RS-232). Using four wires instead of two balances the multiplexed interface signals, thereby extending the permissible cable length from the normal 50 ft. to 1,000 ft.

Finally, and most importantly, bandwidth in this true circuit matrix system is virtually unlimited, and any number of high-speed circuits may be added without diminishing system port capacity.∎

Briefs from **page 9**
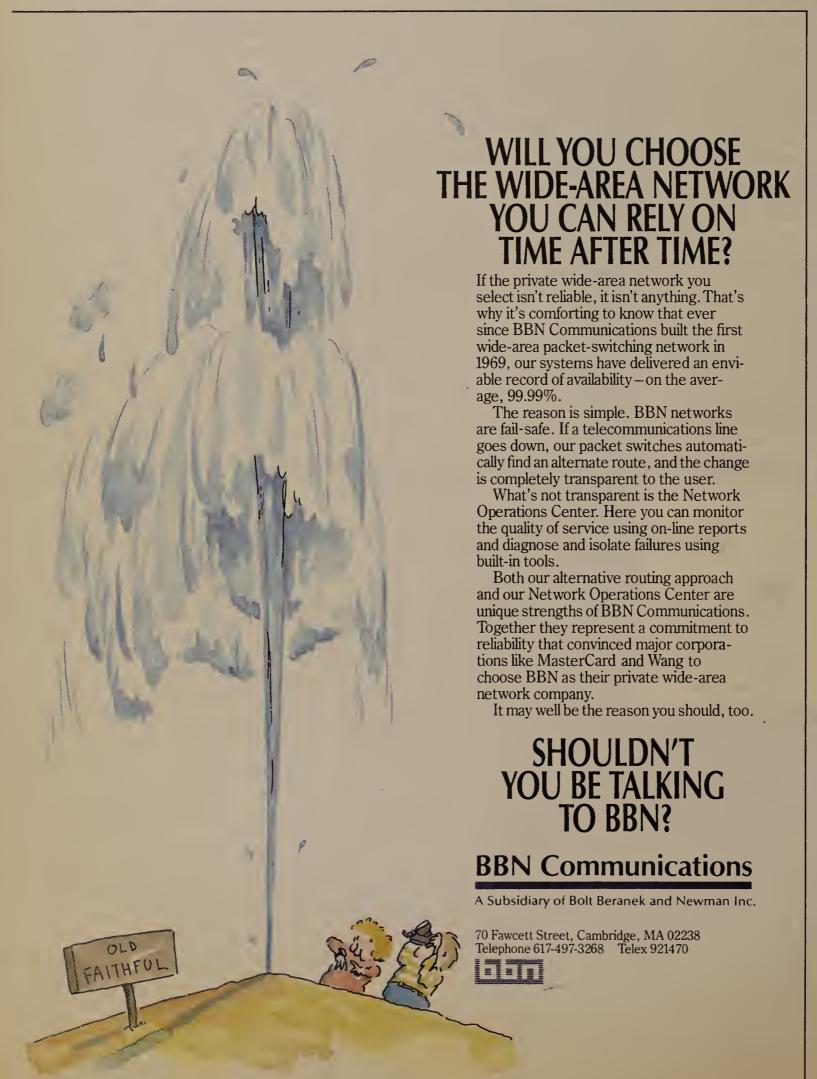
fourth quarter of 1986 and for the year. Sales for the year were up 15.8% over 1985. Net income for the year ended Dec. 31 was up 20.8% compared with 1985. Net income for the fourth quarter was $3,494,000, an 88% increase over the same period in 1985.

$

Fox Research, Inc. signed a distribution agreement with **Avnet, Inc.** for the sale of Fox 10-NET local-area networking systems and communications products through Avnet's subsidiary, **Avnet Computer Technologies, Inc.** (ACTI).

The entire Fox product line will be offered through the 31 ACTI sales and service centers nationwide. Among the services provided by Avnet are system design, configuration and installation. In turn, Fox Research will support the program and its customers with products meeting the International Standards Organization standards.

$

Ericsson Cabling Systems and **Honeywell Inc.'s Optoelectronics Division** have reached a joint marketing agreement that will allow Ericsson's sales force to market Honeywell's fiber-optic modems and multiplexers. The agreement will enable Honeywell to offer complete cable systems that combine the resources of both companies.

$

M/A-Com, Inc. posted first quarter earnings of $2.78 million, up from $2.5 million last year, on revenue of $134.3 million, an increase over last year's $134.2 million. The company implemented a major restructuring program over the course of 1986 that culminated in the sale of its Laser Diode and Information Systems Divisions.∎

TELECOM TRENDS

MRC announces new links to Teleport

Midwestern Relay Co.'s (MRC) Teleport Chicago will reportedly provide toll-free access from other cities to its Ku-band and C-band satellite uplink and downlink facilities beginning April 1. Connections to the Teleport from Milwaukee, Madison and Green Bay, Wis., and Minneapolis, St. Paul and Bloomington, Minn., will be provided over MRC's terrestrial net. Customers need only arrange with the company for local connections to the above cities to access Teleport services.

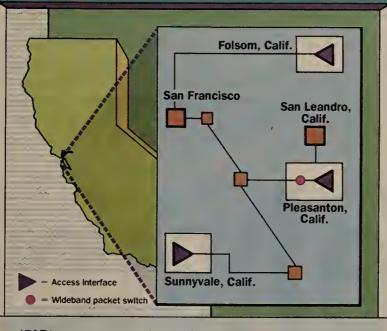## ► CONTRACTS

GE award causes a rumor war

BY BOB WALLACE
Senior Editor

FAIRFIELD, Conn. — Northern Telecom, Inc. was lamenting the loss of a lucrative $400 million network upgrade and expansion contract last week — a contract the user, General Electric Co., says it has not even awarded yet.

GE officials steadfastly maintain that the company has not yet chosen a vendor or awarded a contract for the digital make-over of its corporate network.

Company spokesman Sam Egbert
See **Contract** page 13

AT&T's wideband packet field experiment network

Folsom, Calif.
San Francisco
San Leandro, Calif.
Pleasanton, Calif.
Sunnyvale, Calif.

◄ = Access Interface
● = Wideband packet switch

AT&T last summer completed a four-city, six-month field test of a wideband packet-switching technology designed to test the ability to place voice, data and video information into a common packet. Access interface devices converted the signals into packets, which were transmitted over T-1 lines.

SOURCE: AT&T

► TELECOM SERVICES

Institutions set up their own telco

Young nonprofit group is lead by 33-year Bell vet.

BY MICHAEL FAHEY
Staff Writer

CHICAGO — When Lemuel Tate went to work in 1948 for the Bell System in Evanston, Ill., he never imagined that 35 years later he would be running his own telephone company in the same city.

But that is just what Tate does today. He is currently executive director of NTS Telecommunications Service, a nonprofit corporation that provides communications services for Northwestern University's Evanston and Chicago campuses and for Northwestern Memorial Hospital located here.

"We bill each department for the services they use each month, and they transfer money to my account on a monthly basis," Tate said. "We operate just like a small local operating company. We even have a Class 5 switch just like a Bell central office."

Tate was referring to NTS' two Northern Telecom, Inc. SL-100 private branch exchanges, one of which serves 5,000 lines at Northwestern's Evanston campus and another that serves 9,000 lines at the combined university and hospital complex in Chicago.

Indeed, the modern switching equipment and applications employed by NTS, which was formed in 1983, would be the envy of scores of small telephone companies. In addition to the Northern Telecom SL-100 PBXs, NTS also has a 400-line Northern Telecom SL-1 on hot standby to back up critical university and hospital applications.

The organization's T-1 facilities linking the Evanston campus and the Chicago complex are backed up by redundant facilities as well. In case there is a problem with either of its two sources of commercial power, NTS has a diesel emergency generating system.

The redundancy built into the NTS communications system is necessary because it supports research projects at the university, in addition to critical communications-oriented applications for Northwestern Memorial Hospital, Tate said.

NTS also supports data communications traffic for the university. "We do not specify hardware; we just network it," he said. "We will assist in the selection of hardware if a particular department or customer asks for our help. This varies from department to department. Some don't want our help, others can't get along without it."

Alex Lapson, senior network manager for NTS, works directly with the university's vice-president of information services to plan for the long-term data communications needs of users on campus, Tate said.

Lapson is currently overseeing the installation of a fiber-optic link to connect the university's engineering school, academic computing center and several adjacent buildings. The fiber net will be linked to a nation-
See **NTS** page 13

CROSS TALK
BOB WALLACE

Interim '87 sets the scene for batch of telecom tidbits

VSAT ventures . . .
At the recent International Communications Association (ICA) Interim '87 user conference in San Antonio, Texas, one speaker claimed VSATs are destined for a remarkable future.

Peter Keen, author of the book entitled *Competing In Time — Using Telecommunications for Competitive Advantage*, claimed, "VSATs will do for communications what the personal computer did for computing."

One communications industry analyst and former American Satellite Co. marketing veteran said American Satellite, which is now a Contel Corp. subsidiary, and Martin Marietta Corp. are the front-runners in the race to purchase either part or all of Equatorial Communications Co.

This source explained that American Satellite is interested in purchasing the Mountain View, Calif.-based VSAT network provider while Martin Marietta, which owns 25% of Equatorial, may decide to increase its interest in the firm.

Packet prospects . . .
Again from the ICA Interim '87 user meeting, Howard Frank, former president and chief executive officer of Contel Information Systems, and currently a communications consultant, said the future of private networks, both domestically and internationally,

is in packet switching.

Frank claimed that private X.25 networks are in vogue and will become increasingly popular in coming years. AT&T's developmental work in wideband packet switching was cited as evidence for this claim.

Hewlett-Packard Co. advocates this approach, as shown by its Advancenet corporatewide networking scheme, which is built on a private X.25-based foundation.

The one-stop solution . . .
The communications industry is abuzz with the possibility of one-stop shopping a la EDS Communications Corp. While many speak of the advantage, few discuss the downside of this concept. Dan McFarland, a former telecommunications manager with Electronic Data Systems Corp., cited a major drawback to the marketing method.

"If, at the end of a five-year communications facilities management contract with EDS Communications, a user decides he wants to operate the company's communications network, he's in deep trouble."

In this scenario, McFarland maintained, "EDS owns the user's PBX, all the transmission facilities and all the custom software it developed for the user. The user," he continued, "would be left without a network and without the personnel needed to operate it."

▶ TRANSMISSION CONTRACTS

Short-term can pay off

BY BOB WALLACE
Senior Editor

DALLAS — While many telecommunications managers extol the virtues of long-term, fixed-cost contracts for transmission facilities, others find them restricting.

Robert Mhoon, telecommunications engineering manager for Dallas-based FMC Corp., constantly evaluates the service offerings of numerous long-distance carriers, hoping to trim costs without jeopardizing the quality of service FMC offers its various divisions.

"Long-term, fixed-price contracts prohibit me from evaluating services offered by carriers other than AT&T," Mhoon related. "We strive to listen to as many long-distance service vendors as possible on a continuing basis." FMC is not shopping for service contracts longer than one year, he added.

"With all the fiber that long-haul carriers are laying in the ground, there will soon be a bandwidth glut. We can't take advantage of this situation if we are locked into multiyear contracts for transmission facilities," Mhoon said.

The FMC communications net, which serves six cities, comprises the digital transmission services of AT&T and LDX Net, Inc. Mhoon said that this spring the company will finalize an agreement with Lightnet, Inc. for a T-1 fiber-optic link between the company's sites in Philadelphia and Princeton, N.J.

The network, which is managed by a staff of 22, also boasts Northern Telecom, Inc. SL-1 private branch exchanges in San Jose, Calif., Chicago, Dallas and Philadelphia, and an AT&T System 85 in Minneapolis.

Mhoon explained that meeting with the account representatives from long-haul carriers is not enough to convince him of the quality of their transmission facilities. "We want to speak with the carriers' network operations and their engineering people as well."

The telecommunications manager said he requires prospective suppliers of long-distance communications facilities to provide the company with test circuits.

These circuits are then loaded with voice traffic. If users of FMC's network report problems, Mhoon rejects the alternate carrier in favor of AT&T.

"Users of our corporate communications network can be the loudest complainers," he related. "If we receive any complaints from them, we drop the test circuits and return to AT&T for these facilities." ◪

▶ COMNET '87

Wang hails upgraded controller

Office system now aids smaller firms.

BY BOB WALLACE
Senior Editor

WASHINGTON, D.C. — Wang Laboratories, Inc. last week announced the expansion of the Wang Business Exchange (WBX), an integrated office controller, at the Communication Networks '87 conference and exhibition here.

The WBX, which originally supported 80 telephones, can now reportedly handle as many as 160 stations.

According to Paul Demko, vice-president of communications systems for Wang, "Expansion of the WBX/Wang Integrated Office Solution (WIOS) product line enables us to meet the needs of small to medium-sized businesses and the branch offices of larger corporations."

Cost per line

The vendor said the cost per line will range from $550 to $1,200, depending upon configuration. The enhanced WBX will be available late this summer. This upgrade option is also available to current users of the one-module WBX system.

The device is capable of handling simultaneous voice and data traffic over two-pair telephone wire. The WBX can be linked to a Wang VS processor to form the WIOS.

WIOS is an information processing and communications system designed to support telecommunications, office automation and data processing systems.

The capacity increase of the WBX is accomplished by adding a second module to the controller. While large user companies will likely require a two-module WBX, those companies with fewer users can install a single module at the outset and add the second when needed. ◪

NTS from **page 11**

wide network of supercomputers and the Department of Defense's Advanced Research Projects Agency Network (ARPANET).

This summer, Lapson installed a data communications network for the annual Apple Computer, Inc. University Consortium Conference that employed Northern Telecom and Apple's Macintosh equipment.

The network, installed in two weeks, enabled IBM Personal Computer and Macintosh users to communicate. NTS is also engaged in a major software testing project with Northern Telecom. The project is a trial of Northern Telecom software that takes all the information necessary for a service order — type of customer premises equipment,

where it is to be installed and method of payment — and builds an on-line data base and directory.

The product also includes an automated billing program, a cable record data base and a spare parts inventory. According to Tate, the software has been a great aid in running a large and complex communications network. He said testing of the software is scheduled to be completed in the fall.

Tate's 33 years with the Bell System, which included stints working on rates and tariffs, systems design and data processing, have served him well in running the NTS operation.

In addition to introducing the latest communications technology to his users, Tate said he knows how to run a fiscally responsible operation. "If I didn't," he said, "I'd go bankrupt." ∎

> The software has been a great aid in running a large and complex communications network.

Contract from **page 11**

said, "There is no contract." Egbert would not say when the contract will be awarded. He said it could be worth as much as $400 million over the life of the project.

But a high-ranking source within Northern Telecom, Inc., one of at least two major vendors to bid on the upgrade project, told *Network World* that GE has awarded the contract to competitor AT&T.

The source, who asked not to be named, also said Northern Telecom is challenging GE's decision. "We are protesting the award because the circumstances under which AT&T made its bid were inappropriate," the source said.

An official spokesman for Northern Telecom confirmed that GE had chosen AT&T, but said the two companies have not yet worked out an actual contract.

"We have written off the possibility of being selected to handle the project," he said. Northern Telecom had teamed up with US Sprint Communications Co. to bid on the project. AT&T officials declined comment on the matter.

GE's request for proposal called for a digital make-over of the company's Dialcom corporate communications network. Dialcom is cur-

> "We are protesting the award because the circumstances under which AT&T made its bid were inappropriate."

rently comprised of analog private lines and analog switching equipment. The new network would integrate both voice and data traffic over a single digital net.

The digital net, which is expected to serve some 700 GE sites across the country, will boast 15 or more digital switching nodes that will be interconnected with T-1 lines.

Fiber-optic transmission facilities, digital switches and communications links would also be implemented in the revamped network.

The fortified national communications network would also make use of thousands of local-access lines provided by regional Bell holding companies and bypass service providers.

The digital upgrade of Dialcom would provide integrated voice and data services to GE sites, including those it acquired in its merger with RCA Corp.

GE purchased an 80% stake in Kidder, Peabody & Co., Inc., an investment banking firm, two days after completing its merger with RCA. Kidder, Peabody & Co. sites would be linked to the improved Dialcom. ∎

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DATA DELIVERY

▶ SURVEY

Net management hike

Report finds users plan to double spending in five years.

BY PAUL KORZENIOWSKI
Senior Editor

MARLBORO, Mass. — Although less than 10% of the average communications budget is currently allocated to network management, a study released here recently shows that users plan to more than double spending for net management in the next five years.

According to the The Market Information Center, Inc.'s report entitled, "The Status of Network Man-agement in Large End-User Organizations," expenditures on network management account for about 9% of the average communications budget. But most communications managers deemed that level of spending inadequate, and the study predicts network management will account for roughly 20% of the overall budget by early next decade. The company divided network management into three functional areas: monitoring network activity, problem diagnosis and problem solution.

Survey results were based on responses from managers of 269 companies with an average communications budget of $4.1 million. Respondents managed an average of 638 voice lines, 82 data lines, seven digital data service lines and three T-1 lines. Twenty-two percent of the circuits were digital; the study predicts that percentage will rise to 43% within two years. More than 80% of the users said their networks play a key role in their companies' daily operations.

Nearly half of the respondents said they had a network management system installed. Another 8% were in the process of purchasing one, and more than 40% did not have or plan to have one. The survey found that, on average, respondents maintained a staff of 5.6 peo-
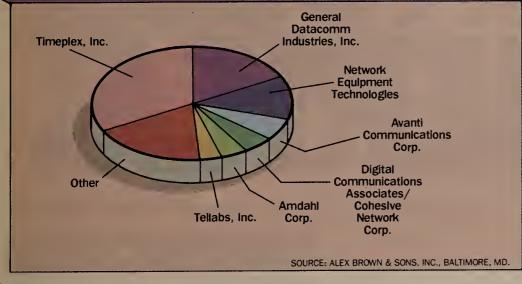See **Manage** page 16

1986 T-1 multiplexer market share

SOURCE: ALEX BROWN & SONS, INC., BALTIMORE, MD.

▶ PRIVATE NETWORKS

T-1 mux market booms

BY PAUL KORZENIOWSKI
Senior Editor

BALTIMORE — Superior network management tools and cost cutting are enticing users to install private networks based on T-1 multiplexers. Because other private network approaches have lacked these items, they have historically been less successful than T-1.

That finding was based on "T-1 Multiplexing Reaches a New Dimension," a report from Alex. Brown & Sons, Inc., a financial services firm here. T-1 networks operate at speeds of 1.54M bit/sec and support voice, data and video transmission.

T-1 can cut a user's voice costs by 20% and data bills by close to 60% without sacrificing reliability, according to the study. The Brown study reported such savings can be expected for local transmissions but not for transmissions of more than 1,000 miles.

Brown estimated that $275 million worth of T-1 multiplexers was sold in 1986, up from the previous year's $175 million in sales. The market had been hindered by the quality of some lines and a delay in obtaining T-1 lines from a telephone company. These problems were solved during 1986 and fueled the market's rapid growth.

The study predicted the T-1 market will grow at an annual rate of 35% for the rest of the decade. The company divided the T-1 market into point-to-point devices, which first surfaced in 1984 at the time of divestiture, and high-end devices from companies such as Network Equipment Technologies Co. (NET). The Brown report said most of the growth rate will come from the high end of the market.
See **T-1** page 17

Just a few more carats for this ring. "Telecom Eye-Bee-EM," a newsletter produced by International Resource Development, Inc., a market research firm in Norwalk, Conn., predicted a second version of the IBM Token-Ring Network will debut during the coming months. The firm predicted the new version will operate at 16M bit/sec and use fiber-optic lines. Also, the first set supporting the International Standards Organization's Open System Interconnect model may hit the streets in the coming months. One item that will not gain Token-Ring support soon is IBM's System/38 minicomputer.

See you later. Like maybe when you're making some money. "Telecom Eye-Bee-EM" also predicted that IBM will bail out rather than increase its stake in MCI Communications Corp. Almost two years ago, IBM purchased 16% of MCI and has an option to increase its investment to 30%.

MCI has been taking it on the
See **IBM** page 16

DATA DIALOGUE
PAUL KORZENIOWSKI

LU 6.2 acceptance may give Big Blue big lead

The ground swell of support for IBM's LU 6.2 communications protocol may be growing, but how it will affect users and IBM is not yet clear. LU 6.2 is a set of programming verbs that enables two applications to hold a peer-to-peer session, regardless of the type of hardware they are running on. The protocol represents a dramatic shift for IBM, whose mainframes currently support master-slave relationships, in which only the host controls the communications session.

The communications protocol, which was announced four years ago, appears to be well on its way to becoming a de facto standard. Already, many office automation vendors have incorporated LU 6.2 into their links to DISOSS, IBM's mainframe electronic mail and library services package. Digital Equipment Corp., Hewlett-Packard Co. and Data General Corp. are among the companies that have linked their wares to DISOSS. Wang Laboratories, Inc. initial-ly balked at support for the protocol but was forced to incorporate LU 6.2 into its DISOSS links.

Large users are allocating resources to examine the protocol and determine how it can best be used. Companies such as Citicorp, Bankamerica Corp. and United Air Lines, Inc. have large LU 6.2 development projects under way. Also, the International Standards Organization (ISO) has incorporated a subset of the protocol's interface into a draft proposal for its Open Systems Interconnect (OSI) network model.

The recent OSI decision represented the second time that the inclusion of LU 6.2 in OSI had come up for discussion. Last year, LU 6.2 was rejected, and the reasons seemed more political than technical. IBM is the only company that can set de facto standards. Historically, the company has used this power to undermine numerous standards. Representatives on the
See **LU 6.2** page 17

Manage from **page 15**

ple for network management, meaning that roughly 21% of the average communications staff of 26 employees was assigned to that duty.

Users listed 30 vendors as their suppliers of network management systems. IBM was the most popular choice, accounting for 18% of the responses. (More than 60% of the respondents had an IBM mainframe.) Codex Corp. took second place with 15.6% of the respondents, followed by Racal-Milgo, Inc. with 10%; General DataComm, Industries, Inc. with 9.4%; AT&T, 7.8%; Paradyne Corp., 6.3%; and Atlantic Reseach Corp. with 4.7%.

Atlantic Research took the honor of having the most highly rated product. The company was followed by General DataComm, Codex, Racal-Milgo, IBM, AT&T and Paradyne. The ratings were based on six categories: ease of use, report generation, overall reliability, restoral capability, traffic rerouting and vendor support.

When asked how much of the day they monitor their networks, close to 30% said between 19 and 24 hours. Twenty-one percent have their network management systems up and running for nine to 12 hours a day, and 20% monitor their networks for less than two hours a day.

Report generation tends to be an important network management function. More than 56% of the respondents said their network management systems produced analysis reports, most manufactured on demand, rather than on a predetermined basis. The types of reports users desired varied greatly and included response-time monitoring, line utilization, activity, problem reports, error rates, downtime and usage reports.

Approximately 80% of the users said their current network management package offers remote diagnostic capabilities. Seventy-four percent could restore service from a central location.

Backup is becoming an important net management item. Fifty-seven percent of the users currently have systems with backup capabilities, and another 16% are evaluating such offerings. Users rated spare units and dial backup as the two key backup components. Uninterruptible power supplies and spare lines were also mentioned as key redundancy components.

Patch panels are still an important restoral technique. Close to 35% of the respondents use only patch panels to restore lines. Another 20% use patch panels in conjunction with matrix switches, and 9% use only matrix switches.

Communications lines running at a speed of 9.6K bit/sec support approximately half of the respondents' applications. Another 40% of the applications run at slower speeds, and only a handful of users worked with high-speed lines, such as 56K bit/sec. The Market Information Center predicted that few users will purchase new hardware simply to improve line speeds.

When asked the network's opti-mal response time, approximately half of the companies said three to five seconds. Two seconds or less was chosen by 18% of the respondents, and 13% indicated that six-to eight-second waits were adequate.

Response-time monitoring packages were not a critical item for most corporations, with only 24% of the companies listing them as such. Approximately 43.5% of the respondents found the packages moderately critical, and 32.5% of the managers said they were not important at all.

A printed copy of the report is available for $995. For $2,500, a customer can purchase the report and a data diskette with complete survey information. ∎

IBM from **page 15**

chin lately with the layoff of 2,300 employees, a $500 million write-off taken in the fourth quarter and a heart attack suffered by its founder, William McGowan. Long-distance communications has not turned out to be the cash cow that many expected at divestiture.

The newsletter pointed out that IBM has not been raking in the money lately, either. The company has been forced to implement its own cost-cutting measures such as an early retirement program. Joint IBM-MCI projects do not seem as inviting as they did a few years ago. ∎

Well, what are you waiting for? NCR Comten, Inc.'s recent release of front-end processor software will put more pressure on Amdahl Corp. By the nature of the market, both companies have to play catch-up with their releases of IBM VTAM and front-end software.

NCR has at least tried to keep pace with IBM, and the new software pulls NCR into a dead heat with Big Blue. Amdahl is lagging well behind and is only able to supply its users with functions found in an IBM 3705. Analysts have been patiently waiting for Amdahl to come out with a new front-end processor compatible with the IBM 3725. If Amdahl doesn't make a move soon, users may question how committed the company is to the front-end processor market and how long they want to remain Amdahl customers. ∎

LU 6.2 from **page 15**

OSI committee got a lot of satisfaction from rejecting LU 6.2. Some were openly boasting about their accomplishment.

However, IBM has quickly become well-schooled in standards body politics. The company began lobbying with the OSI committee representatives immediately after the initial setback. Big Blue was willing to compromise and convinced the appropriate parties that LU 6.2 is an open standard. So, IBM had the last laugh.

One reason the company was successful in overturning the earlier decision is that there are no real alternatives to LU 6.2 currently available. A second interface was also included in the draft proposal, but that interface, which was developed by a U.S. representative to the OSI committee, is completely untested.

The recent decision seems to ensure that two types of OSI models will exist. One will appear almost completely new, and the second will resemble Systems Network Architecture. The committee's decision did little to clarify the larger issue: Which model will dominate, SNA or OSI? The recent action merely postponed a clear-cut decision.

Should the question come up at a later date, it may be too late to choose either SNA or OSI. The committee will be hard-pressed to justify inclusion of an LU 6.2 interface in one part of the model and the exclusion of other LU 6.2 items in other parts of the model. So, it appears likely that OSI will have some type of LU 6.2 support.

This support will make IBM's task a little easier. The company understands that it must link SNA to OSI and has been building bridges between the two network models. Much of that work has been taking place in Europe and IBM has several OSI packages available there.

By accepting a subset of LU 6.2, the committee enables IBM to push LU 6.2 as its bridge to OSI in the U.S. IBM can then save face on its stated commitments to open systems and concentrate on SNA, which it would rather do.

But will widespread acceptance of LU 6.2 really help IBM? Rudolf Strobl, a senior consultant at Arthur D. Little, Inc., in Cambridge, Mass., said that the protocol may actually hurt Big Blue. Acceptance of LU 6.2 will enable users to mix and match hardware. Purchase decisions will be based on which products run the best software and have the cheapest price. Strobl said those products are usually not from IBM.

However, acceptance of the protocol does buy IBM time. The company is more familiar with the protocol than its competitors, so it stands to reason that IBM is a couple of steps ahead of the competition in developing LU 6.2 applications.

First to the market is not a position in which IBM typically finds itself. The company usually waits until other companies develop a market before exploiting it. Times change and IBM's recent financial dip may be attributed to its hesitation to satisfy user demand for connectivity.

The fact that IBM is pushing LU 6.2 demonstrates just how important this issue is to the company. It represents an area where IBM plans to lead aggressively, not follow passively. ∎

T-1 from **page 15**

According to the Alex. Brown study, the growth rate will continue until 1989 when $665 million worth of equipment will be sold. At that time, the market will approach saturation because users will have already installed T-1 multiplexers, and add-on sales are limited because only one multiplexer is needed per site.

Three factors could slow market momentum. First, better network management facilities may spur users to stay with public services rather than migrate to private networks. For this to happen, AT&T and other carriers will have to gain FCC approval, which Brown's report said is an unlikely scenario.

Second, companies like IBM and Northern Telecom, Inc. may enter the market. The entrance of these vendors will cause dramatic price reductions in the T-1 market.

Third, customers are trying to reduce the number of vendors they deal with. This will force T-1 vendors to broaden their product lines.

Brown estimated that vendors have until 1988 to gain significant market share. The company does not expect to see a great deal of successful future competition coming from current start-ups. The most likely T-1 success stories are Timeplex, Inc., NET, Digital Communications Associates, Inc. (DCA) and Tellabs, Inc. Timeplex, seen as the leader in the overall market, will maintain current momentum because of its strong sales and support teams. DCA, which purchased Cohesive Networks, Inc. last summer, will be able to market the Cohesive products effectively. Tellabs will be successful as long as AT&T chooses to be a Tellabs OEM. NET, the leader in the high end, will continue to benefit from its product line and marketing team. ∎

LOCAL NETWORKING

Learn about LANs

San Francisco-based Ferrin Corp. is holding a series of three-day seminars on how to plan and install local networks. "PC LANs: What You Really Need to Know" will be held in San Francisco from March 9 to 11, and in Washington, D.C. from May 11 to 13. Registration is $895 per person. For more information contact Margie Green at (415) 495-8600.

Top transmission choices among local network users

Transmission media

Jan. 1986
Jan. 1987

Fiber-optic: 3% 4%
Twisted-pair: 19% 15%
Coaxial: 78% 81%

Percentage of sites

SOURCE: COMPUTER INTELLIGENCE, LA JOLLA, CALIF.

▶ TWO YEARS LATER

AppleShare server too little, too late

Apple net strategy gets lukewarm reception.

BY PAULA MUSICH
Senior Editor

Despite Apple Computer, Inc.'s recent flurry of connectivity announcements, users say they are not about to change their networking plans to embrace Apple's offerings.

Last month, Apple unveiled its long-awaited AppleShare file server and the Ap-pleTalk PC Card, which allows MS-DOS-based personal computers to access the company's AppleTalk network. Users contacted by *Network World* following the announcements said they believe Apple is moving in the right direction with its networking strategy, but many said they still have no use for Apple computer and communications products.

▶ COMPUTATIONAL SHARING

Apollo's NCS distributes computer applications

BY PAULA MUSICH
Senior Editor

CHELMSFORD, Mass. — Apollo Computer, Inc. unveiled a set of application development tools last week that will allow programmers to develop distributed applications that can be run on networked computers from different vendors.

The Network Computing System (NCS) allows components of a single application to be distributed to specialized computers on the network that are most appropriate for the component's task. Specialized computers can include data base engines, simulators, artificial intelligence machines, parallel processors and supercomputers. NCS, intended for technical applications, can also concurrently distribute program modules and automatically use idle computers on the network to complete computation tasks.

Apollo also announced NCS source code for Unix-based systems and Digital Equipment Corp. VAX/VMS systems. Apollo will license the source code for developers, and the technical workstation vendor made the specifications public for independent implementation. NCS uses low-level datagram services found in such net protocols as the Department of Defense's Transmission Control Protocol/Internet Protocol, Apollo's own Domain Distributed Services, IBM's Systems Network Architecture and Manufacturing Automation Protocol/Technical and Office Protocol data-gram services. It will run over DECnet, Ethernet, Domain, SNA and MAP networks.

NCS, based on Apollo's Network Computing Architecture, represents Apollo's bid to start its own standards ball rolling in the technical workstation environment. Other vendors working to establish such standards include Sun Microsystems, Inc., with its Network File System, and AT&T, with its Remote File Service protocols. NCS, however, provides a foundation for computational sharing, rather than strictly file sharing, across different computer systems.

NCS is made up of three modules. The Remote Procedure Call Runtime Environment is responsible for packaging, transmitting and receiving data, and error correction between subroutines on a server and user's workstation.

The Network Interface Definition Compiler (NIDL) compiles Apollo's high-level language into a portable C language source code that runs on the server and the user's workstation. The Location Broker, which tracks the network's configuration changes, allows application programs to determine during program execution which computers on the network to use to carry out the required service.

NIDL compilers and source code cost from $1,000 to $25,000. UNIX and VAX/VMS source code cost $1,000 each. The published specification lists for $80. All components will be available in the third quarter of 1987. ◪

▤ LANMARKS ▤
PAULA MUSICH

To vanishing vaporware

If delivered as promised in the second quarter of 1987, Apple Computer, Inc.'s AppleTalk network file server, dubbed Apple-Share, will finally be taken off the top of Stewart Alsop's top 10 list of vaporware, products that are announced but undelivered. Alsop, a long-time computer industry watcher and publisher of Stewart Alsop's "P.C. Letter," quite rightly bestowed this dubious distinction on the file server, which was discussed by Apple more than two years ago.

Along with IBM's Token-Ring Network, which was shipped some two and a half years after it was first hinted at by IBM, AppleShare was one of the longest running nonproducts in recent communications industry history. In hindsight, it's easy to say that everyone should have seen it coming. After all, Apple, like IBM, is really a computer company with very little experience in local networking. The company underestimated the effort required to develop its own networking schemes from scratch.

Perhaps these computer vendors and the trade press should have treated the initial announcements as explanations of companies' intentions for the local networking market. Although that makes for less exciting reading compared with the initial hoopla surrounding AppleTalk and the Token-Ring, it's much closer to the truth.

Much of the delay with AppleShare may have to do with the way Apple manages people. In most organizations, projects are designed not to fail. When people working on projects fail to produce, they are replaced and the project goes on. At Apple, projects are thrown at managers, who sink or swim with the project on their own, according to Bob Clark, vice-president at The Seybold Group, a Torrance, Calif., consulting firm. AppleTalk, or the AppleTalk protocol as Apple calls it today, looks very different from the product originally announced.

Delays with the Token-Ring are no doubt related to the fact that IBM had to come up with a scheme for linking different classes of processors and different operating systems, no small task. Besides, it's a very large company, and large companies move slowly.

Undoubtedly, both firms also felt that they were, or would be, late in getting into the market and hoped to preserve market share by dangling a local networking stick in front of their computer users.

If vendors were a little more realistic about product delivery dates and observers exercised a more jaundiced eye — like Alsop's — regarding new product introductions, the industry could go a long way toward ridding itself of vaporware. ◪

Apple from **page 19**

"We have no interest at this time, although we're well aware of the graphics capabilities of the Macintosh," said William Harrop, director of MIS for Kaman Corp. in Bloomfield, Conn. Harrop feels that the availability of more sophisticated links to larger processors, such as IBM mainframes, will make the Macintosh more attractive to corporate users in the future.

For many of the communications managers, Apple's networking scheme for its own personal computers and its links to the IBM world may be a case of too little, too late. "It doesn't really fit in with the way we network PCs," said Philip Wilken, a senior manager of telecommunications for CNA Insurance Companies in Chicago. "We've standardized on IBM's PCs. If we don't understand who they are and what the machine is, we don't interface with it." Other users said AppleShare will only be welcomed by current Apple users, and possibly by companies buying personal computers for the first time. "That's fine for Apple users. We're not an Apple user, and this doesn't provide us with any stimulus for leaving the IBM world," said Von Taylor, communications manager at ANR Freight System, Inc. in Denver. "I doubt the announcements will swing many to Apple who are currently using IBM. For the new personal computer user, it will no doubt make Apple more attractive."

Even in mixed Apple and IBM environments, AppleShare's reception was only lukewarm. The Bank of New England Corp. has some 50 Macintoshes scattered in ones and twos throughout the organization. "In terms of communications, though, Apple really doesn't fit in right now, and Apple's announcements don't really help at all," said Jonathan Oski, senior office systems analyst for the Boston-based bank. Oski networks IBM Personal Computers and compatibles. He does have some Macintoshes tied into the network's Banyan Systems, Inc. servers for file transfer using Centram Systems West, Inc.'s TOPS networking software, which supports Macintoshes and IBM Personal Computers. "We could probably do the same thing using AppleShare, but I'd like to see greater integration of the Mac into our PC network," said Oski. Greater integration means participation in electronic mail and network management, he said.

Industry analysts reacted more enthusiastically to Apple's connectivity announcements. Tim Bajarin, executive vice-president with Creative Strategies Research International, based in Santa Clara, Calif., applauded Apple's new AppleShare file server for its ease of use. "Once you get on-line with this, it's a point and click approach. It's not easy to set up, but once it's up, it's very simple to use." Overall, Bajarin believes Apple is on the right track in trying to penetrate the Fortune 1,000 camp. "It's another one of those things that will help the Macintosh gain respectability in the corporate environment. Appleshare is one of the strategies I consider quite good for getting the Mac into the corporate world. Desktop publishing is the best idea, and AppleShare is the cleanest way to make it work."
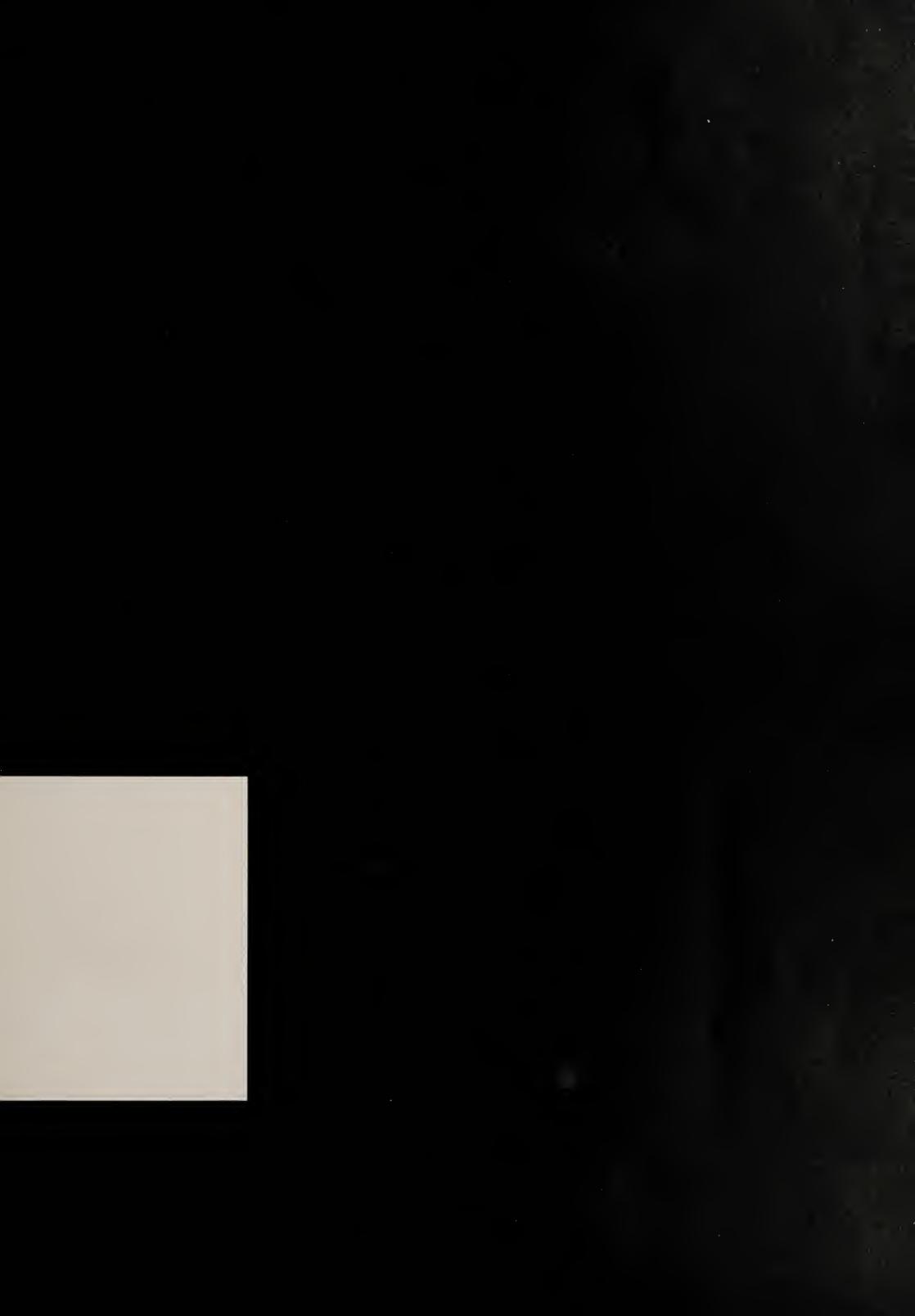
Apple is touting the ease-of-use issue in its strategy to sell Macintoshes for more mainstream applications by arguing that it can save managers a lot of "hidden training costs," according to Bob Clark, vice-president at The Seybold Group. Apple maintains that the amount of turnover in organizations, coupled with the amount of time required to train users for each application on an IBM Personal Computer, eats up a lot of resources in an organization. Applications for the Macintosh all incorporate the same graphic user interface.

"The fact that Apple controls a higher level standard means that a lot of the nitty gritty housekeeping-type things are hidden and not made the responsibility of the end user," said Aaron Goldberg, vice-president of microcomputer services at International Data Corp., a Framingham, Mass., market research firm. "They really simplify the computer operations part of PC usage. In the IBM environment, you don't get that luxury."

Beyond ease-of-use issues, however, connectivity to IBM environments is also a key requirement for Apple's mainstream acceptance in the Fortune 1,000. Both Bajarin and Goldberg agreed that greater DOS compatibility is still needed. They maintain the Macintosh itself needs MS-DOS compatibility because of users' large software investment in MS-DOS applications. "Corporate MIS guys have a lot of money invested in MS-DOS-based software and won't buy a machine that won't run that software," Bajarin said.

Users themselves, because many are now comfortable with DOS, will not go back and relearn another operating system. "The PC mentality will be: 'Well, I can use a Mac, but I can't go back and relearn a new computer,'" Goldberg said. "I think you're going to see a DOS facility in the new Apple products, but there will always be room for another environment." ∎

COMMUNICATIONS MANAGER

►MANAGER SURVEY

Cost of downtime unknown

BY BOB HAMEL
Senior Editor

Although most communications managers understand the importance of emergency telephone system backup, many have no idea how much it would cost their companies if their private branch exchanges went down.

In interviews last week, *Network World* learned that a majority of managers have taken steps to prepare for a PBX outage. But surprisingly few managers know what PBX downtime actually costs or even how to go about determining that cost.
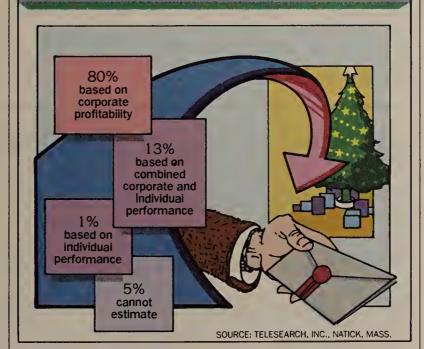
Charles Schrodel, the director of network services for Sun Co. in Dallas, said his company employs a mix of roughly 40 Northern Telecom, Inc. SL-1 and AT&T System 75 PBXs, which are housed at Sun locations nationwide. Schrodel said losing PBX service at a single location "would be painful, but I couldn't put a dollar figure on the cost."

The director indicated that, because of Sun's telecommunications network configuration, a loss of service to all sites would be practically impossible.

"In the event that our master switches in Dallas and Philadelphia couldn't function, PBXs at the individual sites would assume control and route calls," he said.

Like Schrodel, Gerald Babayan, telecommunications manager for Schering-Plough Corp. of Madison, N.J., is prepared for a telecommunications disaster. However,

How year-end bonuses are determined:

- 80% based on corporate profitability
- 13% based on combined corporate and individual performance
- 1% based on individual performance
- 5% cannot estimate

SOURCE: TELESEARCH, INC., NATICK, MASS.

ASSOCIATIONS

The Association for Systems Management is holding a joint meeting this week with the Data Processing Management Association and the Electronic Data Processing Auditors Association. The meeting is slated for 4 p.m. on Feb. 19 at the Marriott Hotel in Farmington, Conn. Howard Berkowitz, a member of the technical staff of the Corporation for Open Systems (COS), is the featured speaker. Berkowitz is currently responsible for designing the COS headquarters network. He is also involved with test tool research and development. For more information, call Richard Hart at (203) 248-7060.

The International Communications Association (ICA) is gearing up for its 1987 Annual Conference and Exposition, scheduled for May 17-22 in New Orleans.

►SCHOLARSHIPS

Lucky 20 win $100K in grants

American Institute awards comm pros.

MADISON, N.J. — More than 200 communications professionals vied to be one of the 20 winners of the American Institute, Inc. 1986 Data Communications Scholarships.

Announced last week in Washington, D.C. at the Communication Networks '87 show, the awards allow 20 communications professionals to attend up to $5,000 worth of American Institute seminars in data or telecommunications studies. Many of the winners were on hand to accept their awards.

The awards, the first for the institute, and they are scheduled to be conducted again in 1987.

The winning applicants represented a cross section of the communications industry, including government, business and education.

Entrants submitted short essays concerning their knowledge of the communications industry as well as their perceptions of upcoming data and telecommunications trends.

Entrants wrote about how their own responsibilities would benefit from the institute's potential training. Also considered in the evaluation process was how the scholarship would enable the applicant to make a contribution to his company.

The scholarships can be used for all courses offered by the institute, including hands-on workshops offered at the national Technology Centers.

The American Institute is a nonprofit organization founded in 1972 to address the needs of business professionals.

As it grew, the institute branched out from providing financial and banking seminars to include the fields of data communications and personal computing. The American Institute is now addressing telecommunications and engineering issues.

Applicants for the 1987 Data Communications Scholarship awards will be accepted later this year.

For additional information, write the American Institute, Inc., Carnegie Building, 55 Main St., Madison, N.J. 07940 or call (201) 822-1230.▪️

GUIDELINES
BOB HAMEL

Users groups talk, vendors listen

Getting a vendor to respond to a user's request to change equipment can be a lengthy, frustrating process. But that is changing.

In the past two years, corporate membership in national vendor-specific users groups has increased substantially. And users groups are finding that vendors pay heed to their requests.

On a national level, groups such as the National Rolm Corp. User's Group, (NRUG), the NEC Corp. NEAX 2400 Users Group, the Intecom, Inc. IBX Users Group and Northern Telecom, Inc.'s SL-1 and SL-100 groups have found they wield clout that individual users lack.

Speaking as one unit, users

are getting vendors to realize that the once adversarial relationship between vendors and users can be replaced with a more cooperative one.

Frank Schoff, the vice-president of committees for NRUG, said the group and Rolm have a good working relationship.

"A combined voice is better than a single voice," he said. "Rolm might not pay attention to a single voice, but it pays attention to us."

What's important to users group members such as Schoff and Helen Waicunas, a core committee member of the NEAX 2400 Users Group, is that the groups act as a focal point for more than just complaints about

their private branch exchange switches.

"We bring up product development issues as well as product complaints," Waicunas said.

By uniting, users are also finding they can resolve some problems without having to address the vendor. Problems that users traditionally went to their vendor to solve are now being solved by their peers.

A national users group is an essential two-way conduit for information and ideas. It provides a vendor with a method of quickly polling its installed base.

According to George Hellyer, president of the SL-1 Users Association, the group gives North-

he also said he could not estimate what a PBX outage would actually cost.

Babayan noted that losing the corporation's centralized order-entry operation for a few days or a week would "result in a significant loss of revenue." Schering-Plough uses AT&T System 75, System 85 and Rolm Corp. 8000 PBXs.

"If the system goes down, we can't take any new orders." For this reason, Babayan has installed a backup PBX on-site and is planning to install an additional out-of-area backup as well.

According to Chuck Garrison, director of telecommunications for the Chicago Board Option Exchange, a one-day PBX outage could be devastating. "It means losing over one million contracts," Garrison said. "Currency contracts alone typically are worth at least $500,000 per contract. Option trading can run from hundreds to thousands of dollars per contract," he continued. "Losing service for a day would involve quite a substantial amount of money."

To prevent any loss of service with the board's eight Rolm Corp. PBXs, which support trading floor activity, Garrison's recovery plan includes the installation of an uninterruptible power supply battery backup system. Garrison said he hopes to also have full generator backup facilities installed within a year and a half.

Telecommunications consultants agree that it is difficult to determine a dollar figure for PBX downtime. They also say that the cost of an outage depends on the company, its market and the importance of telephone service to revenue-generating operations.

Fred Bartl, a vice-president with Needham, Mass.-based Telecommunications Management Corp., a telecommunications consulting firm, divides the justification for backup and recovery services into "hard" and "soft" dollar costs.

Bartl said hard dollar costs are the costs for physical equipment and line-service rental. These costs are easy to calculate. "Adding up the cost to replace damaged equipment and the cost of leased communications lines that can't be used while a PBX is down constitutes a hard dollar figure," he stated.

Bartl contended the soft dollar costs are harder to determine and are unique to individual companies. "If a department store loses communications, it's less critical than if a hospital or investment house loses service," he said.

Bartl noted that most users include a liquidated damage clause in a communications service contract. If a system is out of service beyond a prescribed length of time, the vendor pays a penalty fee to the user.

Combining the hard and soft dollar costs is the only way to define a company's true cost of lost service, Bartl contended. "There is no universal cost applying to all businesses."

Spencer Rice, president of S&R Consultants, Ltd. of Madison, N.J., said the cost of lost PBX service

"depends on the size of the system, the type of market in which the company participates and its dependency on telecommunications." Rice cited one user for which "every call is potentially worth $50,000 in revenue. Losing telephone service for an extended period could be a major problem for the company," he said.

Rice also noted that for some companies, just the appearance of a loss of communications service can be as disastrous as an actual loss of service. "In some markets, image is everything," he said.

John Ungar, executive vice-president for operations at San Francisco-based Comsul, Ltd., agreed that telephone dependency is a key variable in placing a dollar figure on the cost of lost PBX service.

"It's not so difficult for a sales organization to determine the cost," he said. "Revenue generated per day, if a company is telephone-dependent, is a good yardstick."
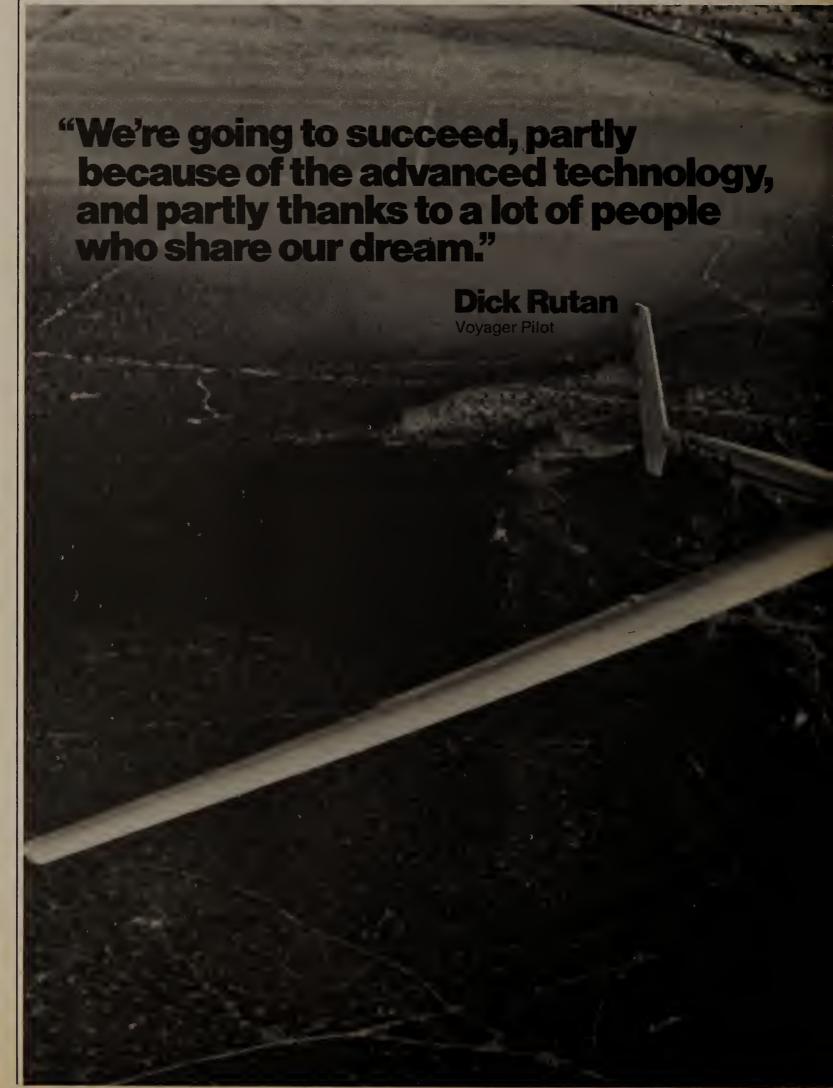
One client of Ungar's, San Francisco's Pacific Presbyterian Medical Center, used a unique approach to circumventing loss of service in the event of a malfunctioning PBX system.

The hospital has certain telephones throughout the center that are hard-wired for Centrex service. If PBX service is lost, the Centrex service becomes available.

"This adds substantial flexibility to their communications system," Ungar said. "With Presbyterian Medical Center, the loss of communications could possibly mean the loss of a life. That's a pretty steep cost." ∎

"Losing service for a day would involve quite a substantial amount of money."

"We're going to succeed, partly because of the advanced technology, and partly thanks to a lot of people who share our dream."

Dick Rutan
Voyager Pilot

Users from **page 21**

ern Telecom "immediate input as to what the customer is looking for in terms of features. They know what they need to provide to maintain a competitive edge," he said.

Many groups have formal response procedures established with vendors. In the formal response, the users group presents the vendor with a list of specific items that need to be addressed.

The vendor, in turn, must respond to the items within a mutually agreed upon time frame.

The response may be that the vendor simply recognizes the problem, or that a solution is currently being sought. But with the formal response procedure, the vendor knows that the concerns of the

group must be addressed.

Getting close to the source and talking to the vendor's research and development people are also valuable benefits of users groups.

One of the ways these groups are getting close to vendors is by hold-

the most important reason for having a national group is that it "lets users be proactive in managing their problems and lets vendors be proactive in addressing development issues."

Although the relationship be-

The vendor knows that the concerns of the group must be addressed.

ing annual meetings near vendors' corporate sites.

By making it easy for vendors to supply resources, users groups are getting more information.

According to Hellyer, perhaps

tween each users group and vendor varies, having a national voice or a direct pipeline to a vendor is the best way to be heard. Users groups are getting results, both for the user and the vendor. ◪

Associations from **page 21**

Registration forms will soon be mailed to representatives of ICA member companies. In a break from past practice, members this year are required to make their own hotel reservations at the New Orleans Hilton Riverside & Towers. To take advantage of the special ICA reduced room rate, members are advised to use the housing cards included in the registration mailing.

Prior to April 10, registration fees for the 1987 conference are $500 for members, $600 for nonmembers and $100 for spouses. After April 10, member and nonmember fees increase by $100, and spouse fees increase to $125. A one-day attendance fee is $195.

Featured speakers for the ICA event include John Naisbitt, author of *Megatrends*, who will kick off the week's activities at the opening ceremonies. Gideon Gartner, chairman and chief executive officer of the research company Gartner Group, Inc., is the featured speaker on May 19.

Alfred C. Sikes, assistant secretary of commerce for communications and information, and administrator of the National Telecommunications and Information Administration, is the latest addition to the speaker lineup. For more information, contact the ICA at (800) ICA-INFO.

In a filing with the Federal Communications Commission, the ICA spoke out against the FCC's proposal to limit regulation of so-called small telephone companies. These companies serve up to 50,000 lines. In the filing, the ICA said such companies are capable of "exercising as much monopolistic market power within the small geographic territories they serve as a large, dominant telecommunications utility may exercise."

The ICA said deregulation would adversely affect customers and that small telephone companies would retain the ability to charge excessive rates because of their substantial market power.

The group urged the FCC to require proponents of the reduced regulation to "provide a clear and convincing showing that any reduction in regulation will not enhance the ability or incentive of small telephone companies to engage in anticompetitive behavior."

In a separate filing with the FCC, the Ad Hoc Telecommunications Users Committee asked for a clarification of the FCC's 1987 Annual Access Tariff Filings. Specifically, the committee is seeking to review the Common Carrier Bureau's handling of the local exchange carriers' pricing of special access Digital Data Service (DDS), high-capacity service (DS-1) and the carriers' nonrecurring charge proposals.

The Ad Hoc Committee said the DDS and DS-1 rate proposals, as accepted by the FCC, could provide up to 40% revenue return and are "clearly excessive." The committee said the local exchange carriers should provide actual, not estimated time and labor costs, to determine nonrecurring pricing. ◪

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PC networking pros have long acknowledged our hardware played to win.

Now they're saying the same about our 3+ software.

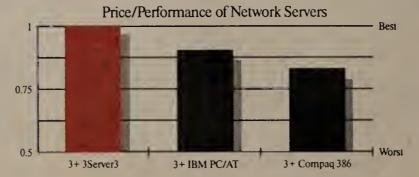Not surprising. Independent tests* show that 3+ is the fastest network operating system you can buy. Whether it's running on a PC/AT, the new Compaq 386 or on our 3Server3 dedicated network server.

Of course, for maximum performance, we suggest you team our 3+ software with a
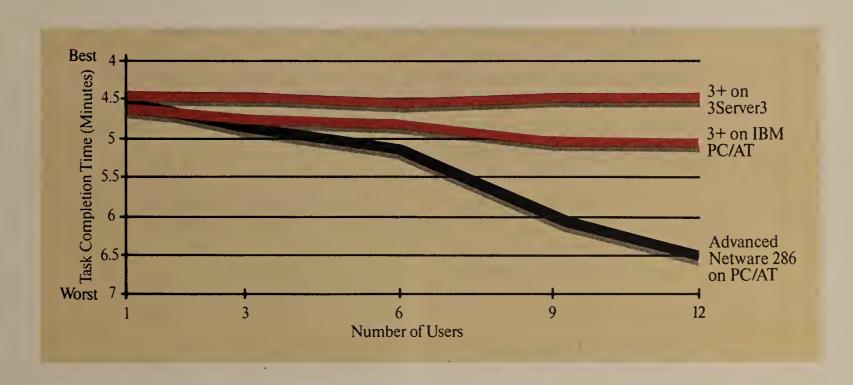
3Server3. Because 3+ magnifies 3Server3's power through programming wizardry like priority disk transfers and look-ahead track buffering.

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Price/Performance of Network Servers

		Best
1		
0.75		
0.5		Worst
3+ 3Server3	3+ IBM PC/AT	3+ Compaq 386

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And its unique elevator seeking algorithm eliminates time-consuming head wagging by directing your server's drive head to the closest data first.

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NEW PRODUCTS AND SERVICES

See inside for:
► Telenet's expanded offerings
► Protocol analyzer software
► Programmable call restricter

► AMNET DEBUT

PCs get packet-switching power

Boards, software let users build X.25 nets.

BY JIM BROWN
New Products Editor

WASHINGTON, D.C. — Amnet, Inc. last week unveiled add-on boards and software that transform an IBM Personal Computer AT with 640K bytes of random-access memory into an X.25 packet-switching node.

The boards used in the IBM Personal Computer AT-based N7400 switching node, which was introduced at the Communication Networks '87 Conference and Exhibition here, use Intel Corp. 80186 microprocessors with 512K bytes of random-access memory.

Each board supports up to four ports operating at speeds up to 64K bit/sec or a single port at up to 256K bit/sec. The boards are priced at $4,875 each.

According to Amnet, the total number of ports each N7400 can support depends on the number of add-on slots on the Personal Computer AT. The IBM Personal Computer AT provides five expansion slots, which net

N7400 X.25 packet switch

LAN = Local-area network
PND = Public data network

SOURCE: AMNET, INC., FRAMINGHAM, MASS.

► VIRTUAL PRIVATE NETS

Telelogic's UNIS controls telecom links

BY JIM BROWN
New Products Editor

SOMERVILLE, Mass. — A system that allows telecommunications managers to create small virtual private networks is expected to be introduced today by Telelogic, Inc.

Telelogic's Universal Network Interface System (UNIS) is designed for users who want to gain control over telecommunications links connecting remote branch offices.

The company, with a $1.4 million infusion of new venture capital, is on the rebound from protection under Chapter 11 of the federal bankruptcy code. Telelogic filed for reorganization under Chapter 11 in December 1985 and completed that reorganization last November.

The two-component UNIS includes the Network Interface Management System (NIMS), a UNIX-based package running on an IBM Personal Computer AT or UNIX workstation. It also uses a series of four-line analog Customer Premise Modules (CPM), which act as gateways from Centrex services, key systems and private branch exchanges to the switched telephone network and private lines.

The NIMS package allows the telecommunications manager to design, implement and monitor a software-defined virtual telecommunications network.

With the package, managers define and assign access to network features, create a dialing plan, list approved carriers and establish preferred routing tables. The information is then downloaded to the CPMs over 1,200 bit/sec modem lines.

A 70M-byte hard disk stores the corporate call routing tables, the base of telecommunications services, carrier selections and other information. The manager can analyze actual usage data, update the data base and automatically distribute the changes to the CPMs.

Each CPM hosts an Intel Corp. 8188 microprocessor with 256K bytes of random-access memory. In addition to the four phone lines, each CPM also provides a 1,200 bit/sec modem that transmits usage data, internal diagnostics and alarm conditions collected at each site to the NIMS. A 9.6K bit/sec serial link connects multiple CPMs together at one site.

Data stored in each CPM allows a caller at one location to dial the location number and extension of a remote office. The on-site CPM translates the dialed numbers into the actual num-

► 3270 COMPATIBLES

Telex beefs up its lineup

BY JIM BROWN
New Products Editor

TULSA, Okla. — In a series of recent product moves, Telex Computer Products, Inc. expanded its line of IBM 3270-compatible terminals, enhanced its integrated voice/data terminal and upgraded a line of IBM 3274 cluster controller compatibles.

The firm enhanced its 274-A2, 274-C2 and 274-61C terminal controllers by adding an option that supports windowing functions for attached Telex or IBM terminals. Windowing allows attached terminals to display as many as four concurrent host sessions in up to four screen windows.

The windowing option requires that the 274 terminal controller support Telex's Multiple Logical Sessions feature, which allows attached Telex and IBM Category A coaxial devices to toggle between as many as four concurrent host sessions. Controller-resident windowing displaces the need for terminals that support windowing, such as IBM's 3194.

According to Telex, the option supports transfer of data from one window to another, including the transfer of data between windows of terminals that support concurrent connections to both an ASCII and IBM host.

The firm also introduced an option that supports attachment of IBM's 3179G Graphics Display Station to a Series 274 controller. The option allows 3179G terminals to utilize the All Points Addressable graphics features available on some IBM hosts.

Telex's 274-A2 Local Control Unit is compatible with IBM's 3274 Model 41A cluster controller, while the firm's 274-C2 Remote Control Unit is compatible with IBM's 3274 Model 41C. These models support 32 terminals each. Supporting 16 terminals, Telex's desktop 274-61C Sixteen Station Control Unit is plug-compatible with IBM's 3274/61C.

Ordered as an option to the 274-A2, 274-C2 or 274-61C, the controller-resident windowing feature costs $1,500. The addition of the required Multiple Logical Session support to the controllers is priced at $1,750. Support for attaching IBM's 3179G Graphics Display Station to a 274 series controller is available at no additional cost.

Also announced by Telex, the 046 Control Unit Display Station features a 15-in. screen and acts as its own terminal controller. Designed for single-terminal remote locations, the 046 is compatible with IBM's 3276 and displays 1,920 characters in either green or amber phosphor.

Available with either an 88-key or 122-key keyboard, the 046 is configured to support either Binary Synchronous Communications or IBM's Systems Network Architecture/Synchronous Data Link Control protocols at speeds up to 19.2K bit/sec.

Telex also added a four-color 14-

► ELECTRONIC MAIL

Telenet links service to Japanese net, telex

RESTON, Va. — Telenet Communications Corp. extended its Telemail electronic mail services by linking Telemail users to telex terminals and by providing connections from Telemail to Acemail, a Japanese E-mail system.

The company, which is owned by US Sprint Communications Co., also announced that it and British Telecom International, Inc. will install an undersea 56K bit/sec link between the two firms' packet-switching communications gateways. The link is expected to be in operation by March.

According to Telenet, the Telemail Telex offering will permit Telemail E-mail service users to communicate with telex users worldwide. The service integrates Telemail and telex addresses and mailbox locations and is aimed as a migration path for current telex users to Telemail.

The package allows Telemail Telex users to type in telex addresses on messages generated under Telemail software. The message is then forwarded to the telex terminal at specified times over a 48-hour period, which reportedly increases the odds of the message being received when the recipient's telex is on.

The service is also integrated into Telenet's PC Telemail, which allows personal computer users to access the Telemail and telex networks. Telemail Telex rates are 46% below real-time international telex charges, Telenet said.

Telenet also expanded its Telemail 400 Global Service with a link to Japan. The ACE Telemail service allows U.S. users to transmit E-mail messages to users of the Acemail system in Japan over an X.400 link, which complies with preliminary CCITT X.400 standards. ACE Telemail uses Telemail software to prepare messages. Telenet charges $1.20 per message unit per address to reach Japan.

Telenet also announced a pricing structure aimed at bringing small business users into the Telemail system. The pricing structure is aimed at travel agencies, transportation companies and international companies with low message volumes. Under the change, low volume users can maintain a Telemail mailbox for $20 monthly, plus usage charges. ⊠

up to 20 ports operating at speeds of 64K bit/sec each. Some Personal Computer AT-compatible makers provide up to 12 slots.

Analysts said the product may grab a lot of attention because it brings packet-switching capability to the less expensive personal computer level. "The interesting thing about this is that it's on a PC," said Kathryn Korostoff, an analyst with the Framingham, Mass.-based International Data Group.

Although the N7400 is targeted at smaller users attempting to build internodal networks over X.25 trunks, the N7400 can also communicate with other X.25 switching nodes and packet assembler/disassemblers — including Amnet's N6021 asynchronous PADs — host computers, local-area networks and X.25 pubic data networks.

The N7400 requires the use of an external PAD and reportedly switches between 300 and 500 packets per second, depending upon the central processor used in the Personal Computer AT. Amnet said it is working on software that will integrate PAD functions into the N7400.

The announcement of the N7400 follows on the heels of the Framingham, Mass.-based firm's introduction last month of a series of asynchronous and synchronous PADs and a scaled-down version of its Nucleus 6000 packet-switching node.

The N7400 employs the same software running on the larger Nucleus 6000 packet switches. The package contains user-defined X.25 routing tables and provides a dynamic backbone-trunking facility with automatic routing, load balancing and congestion control.

Written in C code, the package's network management features include line monitoring as well as reporting of alarm conditions and user-defined threshold violations. In addition, Network Management Processors provide disk-resident logs detailing call accounting, statistical monitoring results and alarm and event histories.

So far unable to grab a sizable slice of the packet-switching market, Amnet is looking for the N7400 to make some noise, analysts said. "It might help them make their mark on the industry or at least make them some money," Korostoff said.

IDC's George Newman agreed. "The N7400 will open some market doors for Amnet."

The N7400 is currently in beta testing and will reportedly be available for shipment this summer.

Also recently introduced by Amnet were the asynchronous N6020 and N6021 PADs, N6025 synchronous PAD, N6026 multiprotocol PAD, N6030 X.25 concentrator and asynchronous PAD, and the N6041 packet-switching node.

Operating at speeds up to 9.6K bit/sec, the $1,850 asynchronous N6020 PAD has four ports, while the asynchronous N6021 has up to 16 ports, two of which can be used for X.25 links to a node or another PAD. A four-port N6021 costs $2,985, and six-port expansion cards cost $1,070.

The N6025's four-user ports support up to 64 terminals using IBM's Systems Network Architecture, Binary Synchronous Communications or Burroughs Corp. Poll/Select protocols. The N6025 ranges in price from $4,595 to $8,155. The rack-mountable 12-port N6026 PAD can be configured to support a mix of asynchronous and synchronous protocols, and it ranges in price from $2,990 to $6,325.

The N6030 X.25 concentrator and asynchronous PAD supports between eight and 32 ports, which can be configured as an X.25 subscriber, asynchronous subscriber or an X.25 link to another node. It operates at speeds up to 64K bit/sec and ranges in price from $7,075 to $15,055.

The N6041 X.25 multiplexing and switching node supports up to 32 X.25 or internodal trunk ports and up to 12 asynchronous or synchronous PAD ports. It operates at speeds ranging from 9.6K bit/sec to 64K bit/sec and will switch 100 packets per second.

A base N6041 with no line cards costs $18,995. Four-port link processor cards operating at up to 9.6K bit/sec are $3,100 each, while a single-port card operating at up to 64K bit/sec costs $5,400.

Amnet also announced it developed an interface that makes its network management package compatible with IBM's NetView, a mainframe-based SNA network management package. ⊠

inch display screen to its integrated voice/data terminal. Priced at $2,995, the C179 supports seven window displays, comprising a 3270 screen, internal modem operation, telephone directory, note pad, emulation of a Digital Equipment Corp. VT-220 terminal, a calculator and a personal agenda.

Logic for five of the seven windows is maintained in a plug-in memory cartridge. Only the 3270 and DEC VT-220 emulation need host interaction.

The logic cartridge supports up to 600 70-character-long telephone directory entries. The terminal connects to an IBM or Telex control unit. It supports asynchronous, BSC and SNA/SDLC protocols.

The C179's two-line analog telephone is controlled from a 14-key feature pad adjacent to the handset on the terminal base. The telephone directly connects to a wall jack, and the 1,200 bit/sec Bell 212A-compatible internal modem operates at 1,200 bit/sec.

Lastly, the firm announced its 191 terminal, an alternative to IBM's 3191. Its 12-inch monitor displays 1,920 characters in either green or amber phosphor.

Similar to the 046 and the C179, the 191 terminal will support connection of a local printer to print screens or serve as a system printer.

Available with either an 88- or 122-key keyboard, the 191 is priced at $1,235. ⊠

Products & Services
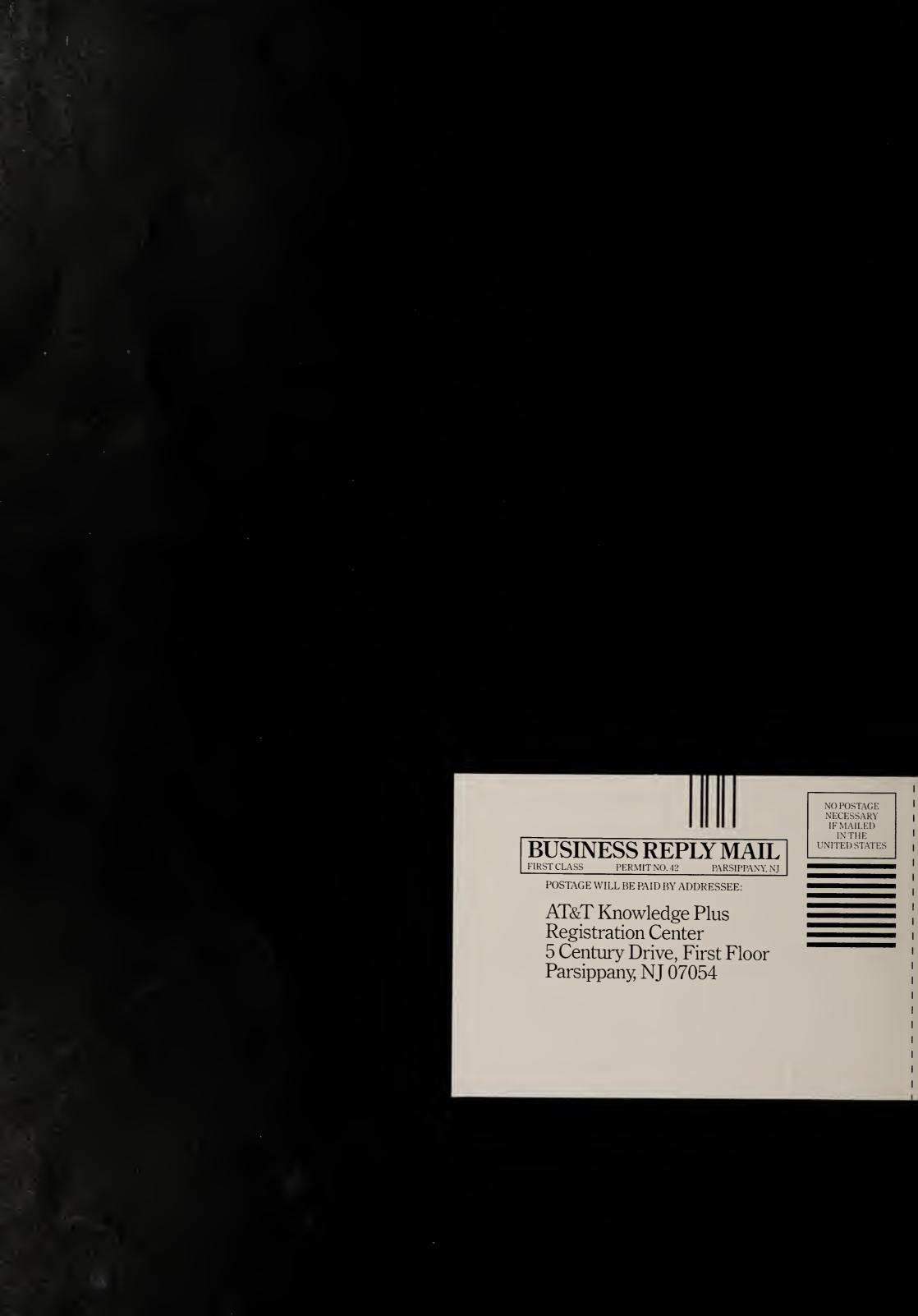
■ Protocol converter, testing packages bow

Tekelec, Inc. introduced a protocol converter that doubles as an X.25 packet assembler/disassembler, as well as packages designed to test X.75, T1C data streams and Common Channel Signaling System 7 protocols.

The **Translator**, a Motorola, Inc. 68000 microprocessor-based communications processor and micro-PAD, emulates a primary and secondary Burroughs Corp. Poll Select device and an IBM 3270 cluster controller.

The unit also functions as an X.25 PAD and switching node. Several translators can be connected over an Ethernet link.

The **X.75 Test Software** runs on the company's Chameleon II and Chameleon 32 multiprotocol test and development systems. It allows users to test station terminating equipment to verify its performance under the procedures recommended by the Consultative Committee on International Telephony and Telegraphy. Developed by Michigan Bell, the package is based on the CCITT's 1980 version of X.75.

The **TE821C Muldem, or multiplexer/demultiplexer,** analyzes T1C data streams, which include two DS1 frames. The device allows users to analyze T1C data from a T1C multiplexer and simulate a variety of errors. The TE821C includes a new B8ZS testing option that allows users to test B8ZS-equipped T1C equipment.

The **Primary Rate Interface** option directly connects Tekelec's Chameleon 32 multiprotocol test and development system to a 1.544M bit/sec or 2.048M bit/sec Integrated Services Digital Network interface. The device tests either the 23B+D or 30B+D primary rates by inserting or extracting information from any one of the 56K bit/sec or 64K bit/sec data, voice or signaling channels. The information is then displayed on the Chameleon 32's front-panel LEDs or the terminal screen. The option includes an interface module with handset, internal multibus board and software.

Pricing

A Translator supporting protocol conversion costs $6,900. Additional conversion packages range from $150 to $350. The X.75 testing package costs $2,000. The TE812C MULDEM costs $4,250, while the B8ZS testing option is priced at $1,750. The Primary Rate Interface Option costs $4,500.

Tekelec, Inc., 26540 Agoura Rd., Calabasas, Calif. 91302 (818) 880-5656.

■ Protocol analysis packages released

Digilog, Inc. introduced three protocol performance packages for its model 800 Protocol Performance Analyzer.

The **SNA manual message generator** allows network testing technicians to generate test messages by choosing from a menu of 31 options rather than entering bit patterns manually.

The messages can be strung together into predefined sequences that support diagnostic routines in IBM's Systems Network Architecture.

The **327x SNA terminal emulation software** makes Digilog 600 and 800 protocol analyzers emulate IBM SNA keyboard display stations. The package allows users to perform diagnostics to determine if problems are in the terminal or host software.

The package also allows technicians to simulate how terminals will be affected by changes in the SNA.

Digilog also announced a **Signaling System Seven Decode** package for its model 800 protocol analyzer. Capable of decoding up to 14 Common Channel Signaling System 7 fields, the software monitors control sequences on a model 800 screen and time-stamps messages. It supports CCITT Q701-Q704 and Q721-Q795 recommendations.

All three packages are priced at $300 each.

Digilog, Inc., 1370 Welsh Road, Montgomeryville, Pa. 18936 (215) 628-4530.

■ PC-based call accounting package

Com Dev, Inc. announced a personal computer package that collects telephone usage data and provides cost allocation and usage analysis as well as client bill-back reports for private branch exchange

Products & Services

Com Dev from page 29

users.

Supporting 75 to 5,000 lines, **CallQuest III** consists of software and a processor board that run on an IBM Personal Computer. The board features a pair of asynchronous ports, one to connect to the PBX, the other to connect to a modem. The add-on board's processor buffers up to 3,400 call records and supports up to 5,000 account or authorization codes. The board also supports call record logging while the personal computer is turned off.

The software transfers the call records from the buffer into a data base on a hard disk. The package also generates reports.

Pricing

The cost of CallQuest III ranges from $2,600 to $20,000.

Com Dev, Inc., 2006 Whitfield Industrial Way, Sarasota, Fla. 34242 (813) 753-6411.

■ Programmable call restrictor

HTC, Inc. introduced a programmable call restrictor that blocks any digit combination on single- or multiline telephones, including private branch exchanges and Centrex-supported systems.

The **Ultimate I Programmable Call Restrictor** uses telephone-line power and rejects methods of bypassing a call restrictor such as pocket dialers, hookswitch flash and waiting for a second dial tone.

Compatible with rotary dial and push-button phones, the unit is programmed from the dial or push-button pad and will accept an authorization code that allows specified callers to bypass the restrictions.

Pricing

Available in hardwire and modular snap-in models, the unit sells at prices ranging between $119.95 and $129.95.

HTC, Inc., 4120 S.E. International Way, Suite A107, P.O. Box 22217, Milwaukie, Ore. 97222 (503) 653-5563.

■ Lancore debuts diskless workstation

Lancore Technologies, Inc. announced a diskless workstation featuring two full-sized bus expansion

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slots.

The **WorkNode** is compatible with a number of network hardware and operating system software products, including Novell, Inc.'s NetWare, IBM's Token-Ring and Personal Computer Networks, and Microsoft Corp.'s MS-Net.

The WorkNode features an internal microprocessor running at 8MHz and supporting 512K bytes of random-access memory. The WorkNode connects to a network through the use of a network adapter card inserted in one of the two expansion slots. When turned on, the unit's read-only memory signals the network adapter card to log on to the network.

The WorkNode is priced at $1,000.

Lancore Technologies, Inc., 31300 Via Colinas, Westlake Village, Calif. 91362 (818) 991-5100.

■ Peregrine upgrades data center package

Peregrine Systems, Inc. enhanced its IBM mainframe-resident, fourth-generation data center management package, PNMS III.

Operating on IBM mainframes running the MVS or

Products & Services

Unix operating systems, **PNMS III Version 3.0** adds a change management module, additional security and a new password application to the package.

The PNMS III tracks software and hardware problems, as well as inventory changes. The change management module lets data center managers log and track proposed system changes and automatically alerts them when deadlines approach. Managers can define additional change categories and generate system problem reports. The problem management application will now support searching of problem reports on a first- or last-page basis.

The PNMS III Version 3.0 package is currently available and ranges in price from $15,000 to $65,000.

Peregrine Systems, Inc., 15530 Rockfield Blvd., Building C, Irvine, Calif. 92714 (714) 855-3923.

■ Package links call options to IBM mini

Dynamic Communication, Inc. released software allowing IBM System/38 minicomputers to access call detail recording features on digital telephone equipment made by AT&T, NEC America, Inc., Northern Telecom Inc. and Rolm Corp.

The **Telemark System** transfers information about trunk traffic, extension activity and cost accounting from the private branch exchange to the System/38 minicomputer. The data can be tailored to departmental requirements. The package features 54 display, menu and inquiry screens and will generate 37 different reports. Output reports and on-line review provide calling pattern analysis and tracing of system misuse.

Pricing

Available now, the package's license fee ranges from $5,250 to $9,000.

Dynamic Communication, Inc., Suite 700, 711 Leydn St., Denver, Colo. 80220 (800) 237-7378. ▪

bers, much like an 800 service, and then routes the call.

According to Gordon Fowler, president of the 60-employee Telelogic, another example of how the system can be used is to automatically forward calls from one location to a remote voice message processor.

Fowler said UNIS can help communications managers use switched services to replace the private tie lines traditionally used to connect remote offices.

With the UNIS system, he said, a user can take advantage of falling rates for switched long-distance services by establishing an internal corporate dialing plan and call routing table.

Telelogic developed UNIS by using the experience it gained in supplying interconnect companies with automatic dialers, which converted customer-dialed numbers into access codes for alternative long-distance services.

The bottom dropped out of the automatic dialer market with the equal-access mandate, forcing Telelogic to develop its new offering. UNIS is aimed at connecting multiple sites with as many as 20 lines each.

The NIMS software costs $7,500, and each CPM is priced at $3,600. The system will initially be sold through distributors. Fowler said a direct sales force will be added later this year. ▪

Opinions

80386 uber alles

New technology arrives in stages. Hardware invariably precedes software — the two seldom achieve the ideal of appearing simultaneously.

Sometimes that gap can be especially long and frustrating, as is the case with personal computers that use Intel Corp.'s 80286 microprocessor. It's been two years since IBM's 80286-based Personal Computer AT was introduced, yet a new operating system designed specifically to support it may still be months from completion.

While users wait for AT software, the 80386-based personal computer has already come out. This machine is a real orphan: It has no operating system, no peripheral devices, and it does not even have a true 80386 expansion bus. However, to the surprise of many industry analysts, people are buying 80386-based personal computers as fast as they can be produced.

Buyers of 80386-based machines are getting a little improvement in processing speed now, and they are gambling that when the 80386 workstation and network operating systems become available, their purchases will be more than justified.

Given the potential of 80386-based microcomputers, that may not be a bad decision. These machines promise to alter end-user computing radically, especially in local-area networking environments.

The Intel 80386 is a 32-bit microprocessor

Durr is senior technical analyst for Novell, Inc. in Orem, Utah, and author of several books, including Micro to Mainframe, *published by the Addison Wesley Publishing Co.*

capable of processing 3 million to 4 million instructions per second. In contrast, the 80286 performs at slightly over 1 million instructions per second.

The 80386's faster processor, plus its 16 MHz clock (the 80286 has an 8 MHz clock) allow the 80386 to process data twice as fast as the 80286 when both are running IBM Personal Computer (8088) software.

The 80386's memory management capability is awesome. It can address up to 4G bytes, compared to the 80286's paltry 16M-byte maximum.

More importantly, the 80386 allows direct addressing to the entire 4G bytes of memory. The 80286 retains the old 64-byte maximum, which forces programmers to work with segments of data, adding programming overhead and slowing performance.

When the 80386's power is available in workstations, one of its uses may be to power Unix applications. Given the number of Unix-based scientific and engineering applications, Unix running on an 80386 will fill a need. However, Unix is not the best choice for a general-purpose 80386 operating system.

Currently, 80386 workstations are trapped in the basic personal computer environment as no operating system exists that supports their advanced capabilities. Power users — those business users who require multitasking or whose applications push the IBM Personal Computer's 640K-byte memory limit — and users with scientific and engineering applications require another environment besides MS-DOS.

An 80386 workstation running Unix could handle scientific and engineering applica-

tions, but would be unsuitable for power users, who require a multitasking MS-DOS-compatible operating system. Such an operating system would have the advantage of supporting familiar MS-DOS applications. It would also have the power and functionality of Unix while being more user-oriented.

With an MS-DOS-compatible operating system, 80386 machines will be able to run multiple MS-DOS applications using the 80386's virtual mode.

In addition to offering users multitasking capability, these machines can act as application servers on a network, running communications, data bases and other large applications.

In a network file server, which manages the network and disk storage, the 80386 microprocessor offers a range of capabilities suited to large-scale departmental and premises networks. With an 80286 network operating system, the current limitation on disk volumes is 256M bytes. Large networks often need bigger volumes, which the 80386's 32-bit processor makes possible.

Because of its memory and processing power, the 80386-based server can support about 500 users. This number can increase significantly when file servers are developed with architectures specifically optimized for the 80386.

The final piece of the new 80386 network environment is the application. New applications must be developed to support larger networks, and the most important of these is the data base management system. The data base server, which runs a portion of the data

ISDNs still worlds apart

Learning from the rest of the world hasn't been our strong suit in the U.S. recently, but it seems reasonable to try to learn more about the progress being made abroad on Integrated Services Digital Networks. After all, ISDN is an international standard.

Two questions have garnered user interest. First, for which purpose will ISDN be more important: reducing operating costs by providing cheaper bandwidth or supporting applications that improve worker productivity? Second, will ISDN's standard interfaces lead to multivendor compatibility?

According to a study of 50 large businesses conducted by International Data Corp. Europa last May, the chief European motivation for

Perry is a senior telecommunications consultant for International Data Corp.'s communications research group in Framingham, Mass.

implementing ISDN is cheaper bandwidth for large business users. European users expect that ISDN will achieve less expensive data transmission by enabling the Post Telegraph and Telephone Administrations' smaller, more expensive data systems to partake of the economies of scale inherent in their larger data systems. Therefore, the key to ISDN's use in Europe is pricing, or tariffs.

The most application-driven European business sectors, chemicals and energy, are trying to find application-based rationales for ISDN. The most promising applications are in combining different media types. For example, integrating telephone activity with computer data base access could improve sales efficiency through more rapid telemarketing, order taking and credit collection. Another promising ISDN application is logistics improvement, in which systems like electronic data interchange auto-

matically transfer information to locations that need it.

The shape of ISDN in Japan indicates that multivendor incompatibility will still be a problem. Japan seems to be creating a proprietary ISDN that doesn't conform with international standards. The Nippon Telegraph and Telephone Corp., which controls 90% of Japan's domestic telecommunications, has been developing its Information Network System (INS) since the late 1970s. Like ISDN, INS integrates analog networks for telephone, facsimile, telex and other services into a unified digital net.
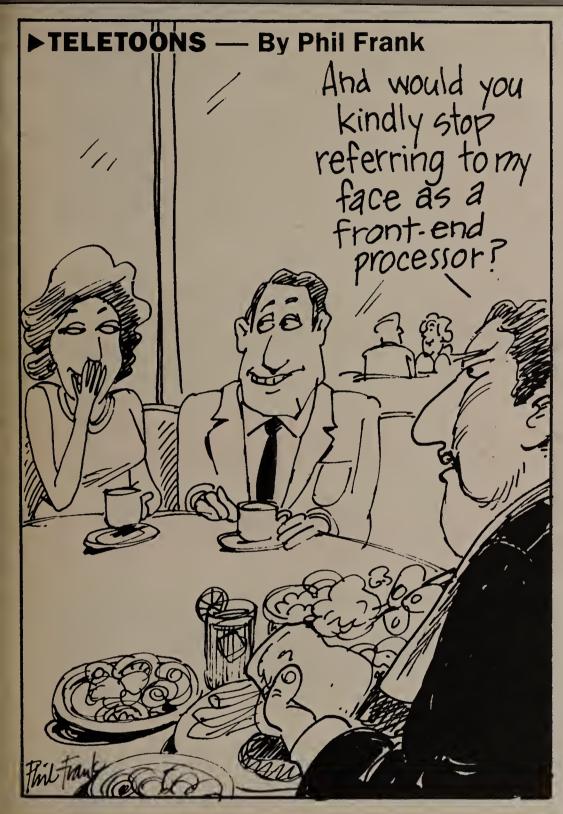
In June 1986, an advisory panel under the Ministry of Posts and Telecommunications criticized the INS plan for four reasons: It's too expensive; it's not fully compatible with international systems; it was carried out too swiftly; and it puts deployment in metropolitan areas before nationwide implementation. In addition, the so-called common

carrier companies, like Daini Denden, Inc., are implementing digital data systems in metropolitan areas without coordinating them with the INS. Despite these problems with INS, Japan may succeed in developing a broad-based residential and small business ISDN that will create demand for mass-market ISDN consumer devices.

In Taiwan, a data transmission joint venture between AT&T and the Director General of Telecom-

Opinions

MANAGEMENT SURVEY
WALTER ULRICH

Keeping up is hard to do

What's bugging you? That, in a nutshell, is the question Coopers & Lybrand posed in a survey of more than 500 vendors, telecommunications professionals and office systems professionals at the International Communications Association and Office Automation conferences last year.

Of the 526 respondents, 79% were users and 21% were vendors. Another 34% of the respondents were office systems professionals, and 66% were telecommunications and networking professionals.

Respondents, who were primarily from manufacturing, government and financial services industries, were asked to identify the main problems they had in doing their jobs. Keeping up with technology, people and company politics were the most frequently selected issues.

Overall, vendors and users gave the issues equal weight. However, telecommunications professionals were more concerned with keeping up with technology, while office systems professionals saw people and corporate politics as somewhat greater concerns.

Concern over keeping up with technology is deepened by the fact that advances in computers, telecommunications and office systems are occurring at an accelerating rate.

Furthermore, the gap between what vendors offer and what users can absorb is widening, and the margin for error in procurement is slim. Subtle differences between products can have a big impact on cost and reliability.

Finally, technologies that are new and exciting today may become obsolete in three years.

No one can expect to be completely current. Therefore, strategies must be developed to leverage the expertise of individuals both inside and outside an organization.

Education and training play an integral role. Active, focused attendance at conferences is valuable for maintaining industry expertise, product knowledge and personal contacts.

Keeping up with people represents both an issue and an op-

portunity. The advent of office information systems and the proliferation of personal computers provide information tools to professionals, administrators and support staff.

These users of technology — not the technical specialists who support the technology — become either victims or beneficiaries of communications and information systems. Therefore, concern with people is appropriate.

Simplicity and ease of use are important. Office information systems and telecommunications systems must be tailored to meet the needs of the individual.

Vendors weighed recruiting as a far more important issue than did users. Currently, users are having success in attracting and maintaining staff. For both users and vendors, the right balance of internal professional staff and external resources will minimize costs and optimize productivity.

The need for communications is well-accepted. For communications professionals, therefore, politics plays a role in determining how much technology they will be allowed to invest in, rather than indicating whether to invest in communications systems at all.

By contrast, some office systems professionals are still trying to justify their existence. While the benefits of office information systems are obvious to the office systems professional, they are not so clear to the executive manager. Systems professionals find promoting technology much more difficult than implementing it.

A professional's view of company politics is healthy when he recognizes a need to articulate benefits and promote them throughout the organization. Resources must be budgeted in any organization, and technology projects will be supported only to the extent that a sound case can be made for them.

Telecommunications and office systems professionals must compete for scarce resources. This kind of competition is healthy and valuable, and its mastery by technology professionals is important.

Managers may perceive organizational politics as arbitrary and capricious when their purely technical arguments are shot

munications is in negotiation. Singapore is conducting a Fujitsu ISDN trial, and an AT&T 5ESS switch is serving as a non-ISDN international gateway. China has shown great interest in ISDN and has a PTT plan to go directly to ISDN for new metropolitan installations. But with phones numbering in the thousands, what the Chinese realistically may be able to implement is reliable plain old telephone service.

Foreign PTTs have the power to innovate quickly and comprehensively. An example is the state-supported implementation of the French videotex system, Minitel. But as the examples noted above indicate, foreign ISDN developments are no longer ahead of those in the U.S., despite the fact that the U.S. regulatory environment made ISDN structurally unfriendly by separating long-haul from local carriers and premises from network termination equipment. ISDN development has accelerated in the U.S. because of the lure of a large homogeneous market, the opportunities created by deregulation, user reluctance to buy nonstandard technology and ISDN's importance

as a strategic weapon for vendors, especially AT&T and the Bell operating companies.

In the U.S., ISDN is a telephony-oriented, vendor-driven system that serves as a strategic weapon for AT&T and the regional Bell holding companies. AT&T will use ISDN to circle the IBM MIS fort with an army of Digital Multiplex Interface licensed third-party vendors, and the RBHCs can use it to fix Centrex. And with added network intelligence, both AT&T and the RBHCs can replace some data communications hardware and pick up Systems Network Architecture and other traffic that now goes over private networks.

ISDN is no panacea for standards problems. Users will see vendor-specific ISDN flavors in the U.S. and country-specific versions in Europe. Basic ISDN gear designed to take advantage of cheaper bandwidths will interoperate with most vendors' equipment, but truly useful, application-driven ISDNs with vertical market software will be proprietary. That means users will have to be especially careful about which vendor they buy from.

Ulrich, a partner in Coopers & Lybrand, manages the firm's Walter Ulrich Consulting subsidiary in Houston.

NETWORK WORLD

Features
February 16, 1987

Product focus: Network management and test equipment

Toning a
network

the problem is complicated by the involvement of both user equipment and carrier facilities.

The question is, which is the culprit? The carrier, the data transmitting equipment (DTE) or the data communications equipment (DCE) that links the DTE to the carrier?

Fortunately, a myriad of test equipment is available that allows users to conduct tests on the analog telephone network to determine its ability to carry data accurately.

To help identify problems with the DTE and DCE, users can choose from low-cost gear that simply checks the signals on equipment interface leads to moderately priced units that can pinpoint errors down to the bit level. For the high rollers, there are systems that will inform operators that problems are about to occur.

Analog line testers

Many communications managers harbor the illusion that carrier problems involving analog lines are best solved by the carrier personnel. After all, they reason, the communications medium must meet

Hunter is president of TMS Corp., a marketing management consulting firm in Devon, Pa.

transmission standards as outlined in Bell System Publication 41008 for analog telephone lines; therefore, conducting measurements to ensure they conform is a simple enough matter for the carrier.

Taking measurements is easy; correcting problems is another matter. Carriers can make mistakes when repairing out-of-specification lines. Once a circuit is back on line, if there is still a problem, the user

Taking measurements is easy; correcting problems is another matter.

has to prove it.

That's where analog telephone line test equipment can help. It can isolate the problem to a particular part of the transmission facility, such as the local loop, the local telephone company central office or the long-distance carrier.

The analog test equipment shown in the chart on Page 35 complies with the general techniques used to measure transmission characteristics as specified in Bell Pub-

lication 41009. Carriers such as AT&T, MCI Communications Corp. and US Sprint Communications Co. have indicated that they will accept the findings of tests conducted in accordance with that specification.

The differences among analog test equipment depend on the range of transmission attributes measured. If users are employing high-speed modems with sophisticated data-encoding schemes, then line characteristics such as phase jitter, envelope delay distortion, impulse noise and background noise are important because they adversely affect the modem's ability to demodulate the received analog information accurately.

The most rudimentary analog test involves measuring the level of signal loss and background noise between the originating and terminating points on the network.

Some analog test equipment is not suited for unattended locations because there must be test gear and someone to monitor it at each end of the network. Such units make measurements in one direction for each test.

Other equipment tests for problems in both directions by accessing tone responders located within the local telephone company central offices or at the customer's location. They loop back the transmitted

nalog and digital
with line testers

Analog telephone line test equipment

Vendor	Model	Loss	Noise	C-notch noise	C-message noise	Impulse noise	Envelope delay distortion	Return loss	Phase jitter	Amplitude jitter	Peak-to-average ratio	Hits and dropouts	Single frequency interference	Bell code 105 test	Bell code 107 test	Bell 829 test	Automatic testing	Price
Ameritec Corp. Covina, Calif.	AM 5	X	X	X	X			X			X					X	X	$3,495 to $4,000
Convex Corp. Washington, D.C.	802	X	X	X	X													$1,680
	806	X	X	X	X											X		$1,865
CXR Telcom Corp. Mt. View, Calif.	156AP	X	X	X	X	X	X	X	X	X	X	X	X	X	X			$2,050
Digilog, Inc. Montgomeryville, Pa.	NAMS	X	X	X	X	O	O	O	O	O	O	O		X	X		O	$20,000 (includes matrix switch)
Electrodata, Inc. Bedford Heights, Ohio	ATS 2	X	X	X	X	X					X					X		$1,995
Hekimian Laboratories, Inc. Gaithersburg, Md.	3701	X	X	X	X	O	O	O	O	O	O	O		O	O			$3,500 to $8,400
	3705-01	X	X	X	X	O	O	O	O	O	O	O		O	O			$8,200 to $13,450
Hewlett-Packard Co. Palo Alto, Calif.	4945A	X	X	X	X	X	X	X	X	X	X	X	X				X	$14,950
International Data Sciences, Inc. Lincoln, R.I.	Model 96	X	X	X	X	X												$1,295
Lear Siegler, Inc. Menlo Park, Calif.	Model 8003	X	X	X	X	X		X			X						X	$3,350
	Model 825A	X	X	X	X	X	X	X			X			X	X	X	X	$7,850
LP COM Co. Mountain View, Calif.	2000-01	X	X	X	X	X	X	X	X	X	X	X	O	X	X		X	$8,145
Network Control Corp. Danbury, Conn.	Janus II Plus	X	X	X	X		X							X			X	$6,000 (100 line unit)
	Janus III Plus	X	X	X	X				X		X			X	X	X	X	$11,500 (1,000 line unit)
Wilcom Products, Inc. Laconia, N.H.	T328	X	X	X	X	X		X	O		O			X			X	$7,995 to $9,000

X = standard   O = optional   Blank = not offered

SOURCE: TMS CORP., DEVON, PA.

In the new world of the IBM Token-Ring network it's nice to see an old familiar face.

The Token-Ring LAN is a reality. It shouldn't surprise you that IBM® was the first company to develop it.

It should be equally unsurprising that the technology that best allows the Token-Ring to communicate with the mainframe comes from DCA, the people who created IRMA.™

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dca®

Analog from **page 34**
tone for measurement.

The most common responders used by local telephone companies support Bell Code Tests 100 through 107. These tests can activate the Bell System 829 and remote isolation device (RID) responders installed at customer sites.

The Code 100 test checks for circuit-level loss and noise. The Code 103 test, performed by the Convex Corp. Model 802, examines the line for its suitability to handle telegraph applications.

Code 107 measures transient phenomena and pinpoints the conditions of those data impairments. The most useful test is Code 105, which measures two-way analog losses plus peak-to-average ratio, nonlinear distortion, signal-to-noise ratio and phase jitter.

The Bell 829 responders work with four-wire leased lines, and RID responders are used with two-wire lines. The loop-back tests performed by both types of responders, however, only measure signal level and verify that the tone can be heard. They are of no value

Digital test equipment can be used to detect software problems occurring in the data path or it can determine the effect of adding new equipment.

in determining if the line can reliably carry data.

Some test equipment, such as that offered by CXR Telcom Corp., and Wilcom Products, Inc., use their own tone generators and responders that measure received tones, store the results and return them to the testing location. These responders provide two-way line testing and, like the Bell 105 and 107, can be programmed to perform sophisticated measurements of data impairments.
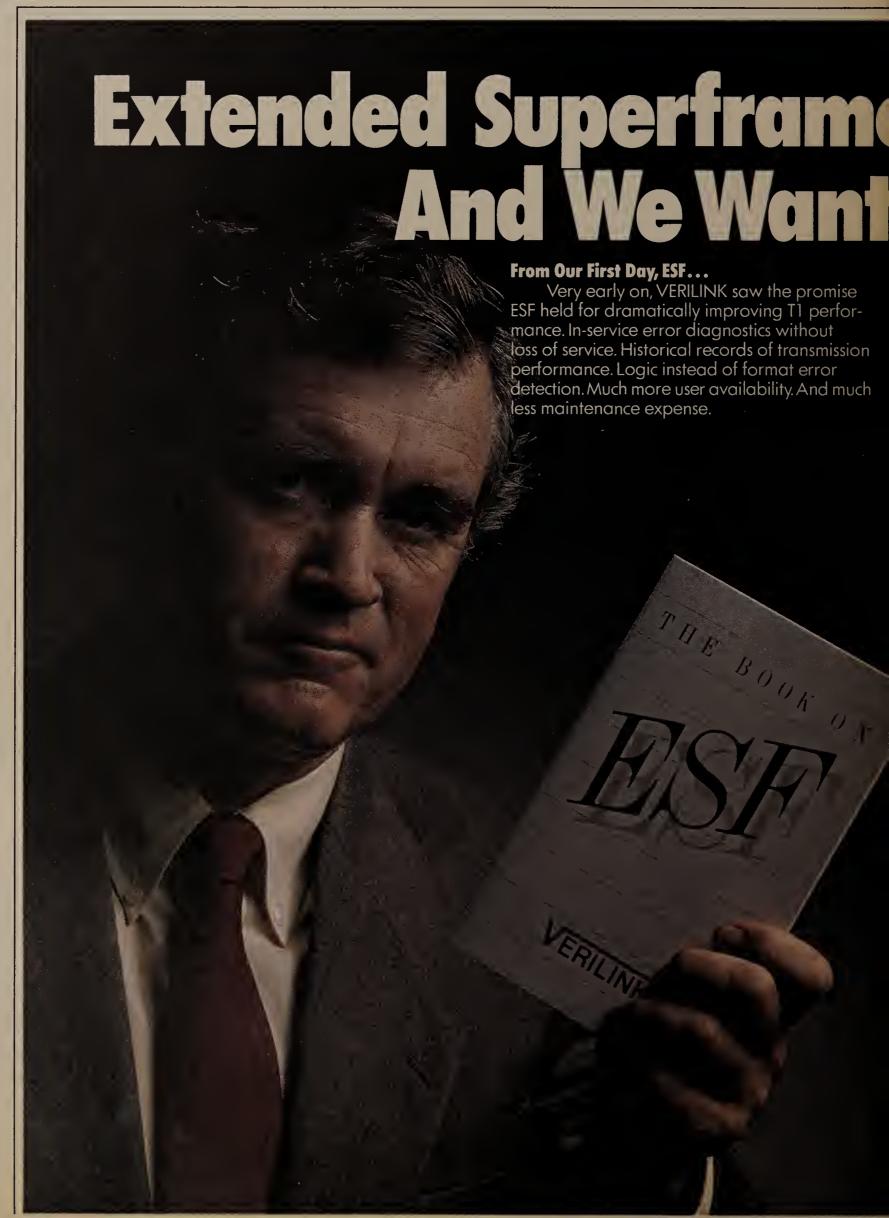
Hekimian Laboratories, Inc.'s Model 3705-01 should

be of interest to T-1 multiplexer users with digitized voice applications because it measures the noise produced by the coders/decoders used to convert analog voice to digital form.

Digital test equipment can be used to detect software problems occurring in the data path, or it can be used to determine the effect of adding new equipment to an existing network. The most popular test gear components are the breakout box, the digital test set and the protocol analyzer.

The breakout box tests the individual data and control pins on equipment interface connectors and uses LEDs to display the status of each. While breakout boxes are available for interfaces such as EIA RS-422, RS-449, CCITT V.21 and CCITT V.35, among others, the most popular in-

The breakout box tests the data and control pins on equipment interface connectors and uses LEDs to display the status of each.

terface application is EIA RS-232-C.

Breakout boxes contain two interfaces, one for attaching the DTE and another for the DCE. As signals are measured, their presence or absence causes the LEDs to light.

Most breakout boxes also contain switches that allow the user to interrupt interface conductors for isolated testing and observation of DTE and DCE signals. In addition, breakout boxes permit users to cross-patch and monitor different pins through the use of miniature jumper cables. This allows a particular signal to be "trapped" when it occurs so the operator can observe it on an LED.

Breakout boxes are offered by nearly 100 vendors.

The prices vary with sophistication, ranging from

Most breakout boxes contain switches that allow the user to interrupt interface conductors for isolated testing.

about $50 to around $200.

Digital test sets use Bit Error Rate Testers (BERT) and Block Error Rate Testers (BLERT) to measure data errors. BERTs generate a test pattern that is looped back between the sending and receiving devices. They also calculate the ratio between the number of bits transmitted and the number of bits in error.

The most popular test patterns are all logical 1s, all logical 0s or alternating 1s and 0s. Another well-known test pattern is the so-called "fox message," which includes every letter in the alphabet plus numbers zero through 9.

The BLERT works like the BERT but measures the number of error blocks in the transmission, as opposed to the total number of bits in error. When used with bit-oriented protocols, a block equates to a frame. Some BLERTs will also count the number of times synchronization is lost.

Digital test sets are offered with a variety of interfaces, such as RS-232-C, RS-449 and V.35. Prices

Breakout boxes permit users to cross-patch and monitor different pins through the use of miniature jumper cables.

vary from $1,500 to $5,000.

Within the last couple of years, a new type of digital test set has emerged that can be used with T-1 transmission facilities. These units measure the number of errors occurring over a given time and are used to determine if T-1 circuits are meeting the carrier's guarantee concerning error-free seconds of transmission. Some products will also count message-frame slips, a problem that causes loss of data over T-1 circuits.

Among the vendors offering T-1 testers are Telecommunications Techniques Corp. of Gaithersburg, Md., Intelco Corp. in Acton, Mass., International Data Sciences, Inc. of Lincoln, R.I., as well as Verilink Corp. in San Jose,

Calif.

The protocol analyzer is a sophisticated device that allows users to observe and analyze such maladies as software errors, improper terminal addressing, changes in control signals on interface leads and parity errors — all without disrupting operations.

The protocol analyzer often incorporates the functions of a breakout box and a digital test set, making it one of the most versatile pieces of test equipment on the market (see the chart on Page 41).

The protocol analyzer monitors both the transmit and receive paths, and displays the test results on a CRT or an LCD. With the CRT and LCD units, data is shown as a series of lines in hex code or binary code, or it is decoded into characters.

Transmitted data is displayed on screen representation. Received data is usually underlined or highlighted to distinguish it from transmitted information. Also shown on

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The protocol analyzer often incorporates the functions of a breakout box and a digital test set, making it one of the most versatile pieces of test equipment available.

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one line, and received data showing errors or the lack thereof is shown below it. Some analyzers use split-the screen are common parameters such as line speed, protocols and code set.

Although most protocol analyzers can accommodate asynchronous and synchronous data, some analyze layered protocols such as Systems Network Architecture/ Synchronous Data Link Control, High-Level Data Link Control and X.25. A couple of the units have an eye on the future by supporting the Link Access Procedure-D channel specified for Integrated Services Digital Networks.

All protocol analyzers listed here also permit interactive circuit testing by emulating a DTE or DCE device. That allows the operator to simulate error conditions so that the cause of the problem can be identified.

The principal reason for using a protocol analyzer is to detect problems by monitoring specific events such as the occurrence of a string of characters, changes in EIA lead control signals, time-outs and parity errors.

Users can program the units to trigger an action when a particular event occurs. A trigger can trap a data stream, highlight a character or trigger a programmed action, in addition to other responses. In short, protocol analyzers simplify the process of identifying problems and enable users to simulate the conditions under which errors occurred to see if they recur.

All protocol analyzers can trap and store information in a capture buffer because most have auxiliary storage such as a diskette or disk. Products such as the new handheld CXR Telcom Model 850 record data in nonvolatile memory and can use a printer to list the contents of the capture buffer.

Protocol analyzers simplify identification of problems and enable users to simulate the conditions under which errors occurred.

Most analyzers also allow users to make the display screen more easily readable by masking out unwanted characters when noncontiguous characters are to be checked. Common interfaces supported by protocol analyzers are RS-232-C, RS-449 and CCITT V.35.

Renex Corp., International Data Sciences, Inc., Frederick Engineering, Inc. and Metatek, Inc. products use adapter boards and software that allow IBM Personal Computers to be used for protocol analysis. That's a smart application because the Personal Computer's microprocessors, internal and auxiliary memory provide a good portion of the services needed to perform protocol analysis.

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1 My primary areas of activity. (Circle ONE only)
I am involved in evaluating communications (data, voice and/or image) products and services:
1. for *use within my own* company/organization
2. for *resale* to other companies/organizations
3. Both
4. Other (explain) _____

1a For communications, my primary responsibility is: (Circle ONE only)
1. Data Communications
2. Voice Communications
3. Both
4. Other (explain) _____

2 Circle only the ONE title classification which most applies to you.
__Company Management__
11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CEO, VP, Dir. Head of Finance, Admin. Procurement
__Communications Management__
Data Communications
21. Management
VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development
22. Supervisory/Staff:
Supervisor, Head: Networking, Design, Analysis, Engineering, R&D, Applications, Services
Telecommunications
31. Management
VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks. Engineering, Design, R&D, Application Development
32. Supervisory/Staff: Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services
Factory Communications
41. Management
42. Supervisory/Staff
__MIS/Data Processing__
51. Management
VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation
52. Supervisory/Staff: Supervisor, Head of Systems Design, Analysis Applications
__Others__
75. Consultant
80. Educator
85. Financial Analyst
90. Marketing/Sales
95. Other _____

3 Job Function
Which one of the following best describes your functional involvement with communications (data, voice, and/or video) products? (Circle ONE only)
__Corporate__
1. Business Management, Planning and/or Development
__Communications System/Network__
2. Management, Planning and/or Development
3. Implementation and/or Operation
4. Other _____

4 Which one of the following best describes the primary business activity of your organization at this location? (Circle ONE only)
__Consultants__
11. DP/Communications Consulting Services
12. Consulting Services (except DP/ Communications)
__End Users__
13. Manufacturer (other than computer/communications)
22. Finance/Banking/Insurance/Real Estate
23. Education
24. Medicine/Law
25. Wholesale/Retail Trade
26. Public Utility/Transportation
27. Mining/ Construction/ Petroleum Refining/ Agriculture/ Forestry
28. Business Services (excluding DP/Communications)
29. Government: Federal
30. Government: State/Local
__Vendors__
41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, International Records Carriers
42. Interconnect
43. Manufacturer Computer/Communications Equipment
44. Value Added Reseller (VAR), Systems House, Systems Integrator
45. Distributor
46. DP/Communications Services (excluding consulting)
95. Other _____

5 In which ways do you typically become involved in acquiring communication products (data, voice, and/or video) and services? (Circle ALL that apply)
1. Recommend/Specify
2. Identify/Evaluate Potential Vendors
3. Approve the Acquisition
4. None of the Above

6 Check ALL that apply in columns A and B.
A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:
B. These products and services are presently in use at this location:

A	B	Product/Services	A	B	Product/Services
		Computers			*Transmission/Network Services Equipment*
01. ☐	☐	Micros	18. ☐	☐	Microwave
02. ☐	☐	Minis	19. ☐	☐	Satellite Earth Stations
03. ☐	☐	Mainframes	20. ☐	☐	Local Area Networks
34. ☐	☐	Printers	21. ☐	☐	Wide Area Networks
		Data Communications	22. ☐	☐	Packet Switching Equipment
04. ☐	☐	Communications Processors	23. ☐	☐	Fiber Optic Equipment
05. ☐	☐	Comm./Networks Software	36. ☐	☐	T1
06. ☐	☐	Digital Switching Equipment			*Communications Services*
07. ☐	☐	Facsimile	24. ☐	☐	Packet Switching Services
08. ☐	☐	Modems	25. ☐	☐	Cellular Mobile Radio Services
09. ☐	☐	Multiplexers	26. ☐	☐	Electronic Mail
10. ☐	☐	Protocol Converters	27. ☐	☐	Enhanced Services
11. ☐	☐	Network Mgmt. & Control	28. ☐	☐	Centrex
12. ☐	☐	Test Equipment	29. ☐	☐	Long Haul Services
13. ☐	☐	3270 Controllers	30. ☐	☐	BOC Services
35. ☐	☐	Intelligent Terminals	31. ☐	☐	Independent Telco Services
		Telecommunications			*Other*
14. ☐	☐	PBXs	32. ☐	☐	Factory Communications
15. ☐	☐	Key Systems	33. ☐	☐	Online Data Bases
16. ☐	☐	Central Office Equipment			
17. ☐	☐	Integrated Voice/Data Terminals			

7 Estimated value of communications systems, equipment and services:
A. which you helped specify, recommend or approve in *last* 12 months? (Check only ONE in column A.)
B. which you plan to specify, recommend or approve in *next* 12 months? (Check only ONE in column B.)

A	B		A	B	
1. ☐	☐	$10 million and over	6. ☐	☐	$100,000 - $249,999
2. ☐	☐	$5 million - $9.9 million	7. ☐	☐	$50,000 - $99,999
3. ☐	☐	$1 million - $4.9 million	8. ☐	☐	Under $50,000
4. ☐	☐	$500,000 - $999,999	9. ☐	☐	Don't Know
5. ☐	☐	$250,000 - $499,999			

8 Estimated gross annual revenues for your entire company/institution:
(Circle ONE only)
1. Over $1 billion
2. $500 million to $1 billion
3. $100 million to $499.9 million
4. $50 million to $99.9 million
5. $10 million to $49.9 million
6. $5 million to $9.9 million
7. under $5 million

9 Estimated number of total employees at this location:
(Circle ONE only)

1. Over 5,000	3. 500 - 999	5. 100 - 249	7. 20 - 49
2. 1,000 - 4,999	4. 250 - 499	6. 50 - 99	8. 1 - 19

3A06-86

PLACE
POSTAGE
STAMP
HERE

▲
FOLD HERE AND MAIL TODAY

STOP. Did you do the following:

1. Supply old and new address if address has changed
2. Answer all questions
3. Sign and date form

Enclosed is my:
  ☐ Address change.
  ☐ New subscription request.

THANK YOU.

NETWORK WORLD
THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

PLEASE TAPE HERE
▲

While most digital test equipment is used simply to identify the cause of data transmission errors, new equipment that is added to a network should also be tested. Adding a new device to a network can change polling sequences, which, in turn, can have an adverse affect on system performance, depending on the frequency at which terminals are polled.

In networks where many different vendors' products are used, new components may cause compatibility problems.

For example, some interface pins on a new terminal might be designated as unassigned or reserved for future applications by one vendor, while devices currently on the network might use one of those pins for something different, such as initiating a diagnostic routine.

Also, incompatibility can occur at the protocol level, such as when the length of a packet varies or when there is no restriction on the use of synchronous or pad characters. Testing new components before introducing them to the network will identify such incompatibilities.

For those companies that want to perform tests on an entire network and remove problematic components from service, a network management system is the way to go.

Such systems perform analog and digital line tests as well as tests

which bridges a modem's input and output lines and permits users to observe data on either side of it or to isolate it from the communications facility — now allows any modem to be used with these products.

Prices for network management systems vary with sophistication

For those companies that want to perform tests on an entire network and remove problematic components from service, a network management system is the way to go.

of individual network components such as modems and multiplexers.

The Codex Corp., General DataComm, Inc., Paradyne Corp. and Racal-Milgo, Inc. devices previously performed only with specific modems designed for their equipment.

However, use of a wrap box —

from around $15,000 to more than $100,000. Although their prices are high, remember that network management systems also signal impending problems before they become immediate ones.

The basic network management systems furnish all of the hardware and software needed to continuously monitor components for user-defined alarm conditions such as streaming modems or terminals. They also provide the capability to isolate failed components and switch in hot spares.

The basic systems generally are packaged with secondary channels, which are used to relay tests and test results between the components being monitored and the control console.

While the number of secondary channels provided for the base price varies among vendors, 16 subchannels appears to be the average.

The price of network management systems increases as users add more secondary channels, additional control consoles and storage media such as hard disks and tape drives.

The upper end of the price range usually includes one or more minicomputers at the central site, which are used to provide data base management services and to perform network management functions. ⚡

Digital test equipment: protocol analyzers

Vendor	Model	Protocols monitored	DTE/DCE emuluation	Traps on	Capture buffer size (bytes)	Auxiliary storage size (bytes)	No. of lines by no. of characters displayed	External clock rates (bit/sec)	Price
Atlantic Research Corp. Springfield, Va.	Interview Comstate I	SNA/SDLC, BSC, HDLC, X.25, IPARS, asynchronous	✔	Character, character strings, parity errors, EIA lead changes, message block number, CRC, LRC, bits	32K	192K	16 x 32	50 to 64K	$5,900 to $7,000
CXR Telcom Corp. Mountain View, Calif.	Model 840	SNA/SDLC, 8SC, DDCMP, IPARS, HDLC, X.25, asynchronous	✔	Character, character strings, EIA lead changes, parity errors, CRC, LRC, bits	16K	None	512	50 to 64K	$2,750
Digilog, Inc. Montgomeryville, Pa.	Digilog 400	Any bit- or byte-oriented protocol	✔	Character, character strings, EIA lead changes, poll count, CRC, LRC, parity errors, bits	32K	832K	16 x 32	50 to 72K	$7,495 to $8,695
Digitech Industries, Inc. Ridgefield, Conn.	Model 500/700	SNA/SDLC, DDCMP, PARS, IPARS, 8SC, X.25, asynchronous, Burroughs Poll-Select	✔	Character, character strings, EIA lead changes, parity errors, CRC, LRC, bits	128K to 256K	800K to 10M	640 to 2000	50 to 256K	$4,000 to $22,000
Dynatech Packet Technology, Inc. Alexandria, Va.	Net/18	X.25, X.75, 8SC, HDLC	✔	Character, character strings, bits, frames, packets, EIA lead changes	5K	100K to 300K	24 x 80	up to 16K	$15,995 to $17,590
Frederick Engineering, Inc. Gaithersburg, Md.	Feline	DDCMP, SDLC, X.25, HDLC, asynchronous, synchronous	✔	Character, character strings, bits, frames, packets, EIA lead changes, LRC, CRC, parity errors	64K to 576K	720K to 20M	25 x 80	50 to 64K	$1,595
Hewlett-Packard Co. Palo Alto, Calif.	Model 4952A	SNA/SDLC, X.25, BSC, IPARS, DDCMP, LAP-D, Burroughs Poll-Select, asynchronous, synchronous	✔	Character, character strings, bits, EIA lead changes, frames, packets, CRC, LRC, parity errors	32K to 750K	618K	16 x 32	50 to 64K	$6,450 to $8,500
Idacom Electronics Ltd. Edmonton, Alberta	PT 368.1	SNA/SDLC, BSC, X.25, LAP-D, HDLC, asynchronous, synchronous		Character, character strings, bits, packets, frames, CRC, LRC, EIA lead changes	64K	800K	23 x 80	50 to 72K	$18,995 to $25,595
International Data Sciences, Inc. Lincoln, R.I.	Model 5300	8SC, HDLC, asynchronous, SNA/SDLC, X.25 optional	✔	Character, character strings, EIA lead changes, CRC, LRC, parity errors, framing errors, bits	16K to 512K	320K to 10M	10 x 64	50 to 72K	$1,995 to $3,885
LP COM Co. Mountain View, Calif.	TC-2000-02	SNA/SDLC, HDLC, 8SC, X.25, IPARS, asynchronous, synchronous	✔	Character, character strings, bits, EIA lead changes, parity errors, CRC, LRC, frames, packets	1M	8.3M	N/A	300 to 64K	$7,500 to $15,000
Metatek, Inc. Minneapolis	MetaScope	8SC, SDLC, HDLC, asynchronous	✔	Character, character strings, EIA lead changes, CRC, parity errors, LRC, bits	N/A	360K	16 x 80	50 to 19.2K	$1,595
Navtel, Inc. Norcross, Ga.	Datatest 5	SDLC, X.25, HDLC, asynchronous	✔	Character, character strings, EAI lead changes, parity errors, CRC, LRC, bits	64K	1M	14 x 60	up to 64K	$4,995 to $10,000
Northern Telecom, Inc. Spectron Division Marlton, N.J.	Datascope D-2000	8SC, SDLC, X.25, asynchronous	✔	Character, character strings, EIA lead changes, CRC, LRC, bits	256K	800K	10 x 25	50 to 19.2K	$3,600
Renex Corp. Woodbridge, Va.	Datahalk	BSC, SNA/SDLC, HDLC, X.25, asynchronous	✔	Character, event, EIA lead changes, parity errors, CRC, LRC, bits	16K to 256K	up to 10M	22 x 70	50 to 19.2K	$1,175
Telebyte Technology, Inc. Greenlawn, N.Y.	Netscope	SDLC, X.25, 8SC, asynchronous, synchronous	✔	Character, character strings, EIA lead changes, parity errors, CRC, LRC, bits	13K	None	12 x 80	75 to 38.4K	$1,800 to $2,000
Telenex Corp. Mount Laurel, N.J.	Autoscope	8SC, SDLC, DDCMP, HDLC, IPARS, UTS, Burroughs Poll-Select, X.21	✔	Character, character strings, parity errors, EIA lead changes, CRC, LRC, bits	64K	6.4M	16 x 80	50 to 72K	$10,000 to $20,000
Tekelec, Inc. Calabasas, Calif.	Chameleon-32	SNA/SDLC, 8SC, HDLC, X.25, X.75, UTS, Burroughs Poll-Select, asynchronous, LAP-D	✔	Character, character strings, EIA lead changes, event, parity errors, CRC, LRC, bits	144K	10M	24 x 80	50 to 64K	$21,500 to $33,000
Tektronix, Inc. Beaverton, Ore.	Model 835	BSC, SDLC, HDLC, asynchronous	✔	Character, character strings, EIA lead changes, parity errors, CRC, LRC, bits	4K	None	16	50 to 19.2K	$3,350

BCS = Binary Synchronous Communications
CRC = Cyclic redundancy check
DDCMP = Digital Data Communications Message Protocol
DTE/DCE = Data terminal equipment/data communications equipment

EIA = Electronic Industries Association
HDLC = High-Level Data Link Control
IPARS = International Passage Airline Reservation System
LAP-D = Link Access Procedure-D channel
LRC = Longitudinal redundancy check

PARS = Passenger Airline Reservation System
SDLC = Synchronous Data Link Control
SNA = Systems Network Architecture
UTS = Univac Terminal System

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Donnelley Demographics	*Information on U.S. Corporations*
U.S. Census Information	Trademarkscan
Dun. & Bradstreet	*Active U.S. Trademarks*
(Selected Databases)	TRINET
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Datasolve Information Online	Questel, Inc.
DataTimes Information Network	SDC Information Services
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Letters

Equatorial digs out

"Equatorial seeks buyer as way out of VSAT hole" (NW, Feb. 2) misrepresented Equatorial's current conditions and actions. The decrease of manpower in June of 1986 was from 696 to 665, not 700 to 36 as you stated.

In 1986, Equatorial experienced its first nonprofitable year since 1982, its first full year of product shipments. This was due in part to the extensive investments required to develop an operational VSAT networking capability. Also, an extended sales cycle resulted in revenues falling below sales forecasts. At midyear, Equatorial started to correct its expense levels to reflect the lower revenue. At the end of 1986, a staff of approximately 400 and new orders left Equatorial with money in the bank and good prospects for growth.

The loss situation will take more time to correct fully, but the process is in motion. Since November of 1986, Equatorial has added to its customer base companies and agencies including Avis, Amoco, the Bureau of Land Management, the U.S. Forest Service and the Government of India.

As Osa Mok [Equatorial's assistant treasurer] stated, it is true that Equatorial has been seeking an additional equity source to enable the company to maintain its aggressive R&D effort while the expense/revenue imbalance is corrected in 1987.

Edwin B. Parker
Chairman of the board
Equatorial Communications Co.
Mountain View, Calif.
Ed. reply: Network World *regrets the error in reporting Equatorial's layoffs. We stand behind the remainder of the article.*

last year's figure of 15,500. The number of exhibitors was up to 321 from the previous year's 275. Vendors unveiled an estimated 100 new products during the show.

But more important than the announcements were signs of industry transformation. Users at the show told of trouble integrating and managing various network components and said they came in search of products that could help with that task.

Exhibitors spoke of the need to position themselves as primary network suppliers and the importance of offering full product lines rather than competing on single-product bells and whistles.

Some companies are trying to integrate their products with other vendors' offerings, while others are cutting OEM deals in an effort to broaden their product lines. Still others are trying to offer or support integration tools, particularly network management facilities, that can be used over a wide variety of devices.

An army of IBM representatives thronged the show floor trying to convince users that NetView, IBM's network management system, can help customers tame unruly networks.

The first release of NetView was on prominent display at IBM's booth. A second version, which will integrate alarm conditions from other vendors' equipment and be available in the third quarter, was also shown. IBM is actively recruiting vendors to interface their products with NetView through a NetView gateway.

But perhaps most telling was the news of two OEM agreements, one involving data communications equipment supplier Codex Corp.

Codex has reportedly inked an OEM agreement with T-1 multiplexer newcomer Stratacom, Inc., after that company failed to finalize a similar deal with Doelz Networks, Inc., a maker of virtual circuit switches. When that deal went sour, Doelz turned to Network Equipment Technologies Co. (NET), the highly successful Redwood City, Calif.-based vendor of T-1 switching multiplexers.

Although Codex and Stratacom admitted they were engaged in discussions, both companies denied allegations that a deal has been struck, contrary to what sources close to the companies maintained.

Sources say the Codex/Stratacom arrangement will initially call for joint marketing and, later, the development of a network management system capable of controlling both companies' product lines.

Doelz and NET have entered into a similar joint marketing and product development deal scheduled to run for two years. Doelz had reportedly been looking for a partner to broaden its market reach.

A few weeks before the show, Frank Connors, president of Doelz, and Stratacom President Richard Moley told members of the press that the companies would make a joint announcement at the conference, presumably an OEM agreement of some kind.

The weekend before the show, the proposed agreement fell through. Doelz had been courting NET for three years and then grew impatient and turned to Stratacom in an attempt to cut an alliance.

Bruce Smith, president of NET, claimed the company was always interested in an agreement with Doelz but was unable to pursue the matter because of the pressures involved in the company's recent public stock offering. NET decided to move more quickly when it realized that Doelz planned to sign an agreement with a competitor.

ago, US Sprint has added two million business and residential customers to its base of 2.7 million. But the company's network expansion has not kept pace with its expanding customer base, and the company now relies on AT&T to support roughly 28% of its traffic.

US Sprint has earmarked a total of $2 billion for the construction of a nationwide fiber-optic network. During 1986, the company's success in signing on new customers led to an unexpected shortage of capacity on the old network.

"We decided not to add capacity to the old network, which we'll be retiring shortly," explained Don Forsyth, a spokesman for United Telecom, parent company of US Telecom, Inc., the US Sprint partner. "During this transition time, we've assumed additional costs for leasing capacity. That will diminish as we move onto fiber."

The additional costs played a damaging role in the financial performances of both United Telecom and GTE. Last week, United Telecom posted quarterly earnings of $28.3 million on revenue of $738 million, compared with last year's loss of $141 million on revenue of $790.5 million.

GTE announced fourth quarter earnings of $268.2 million as compared with last year's extraordinary loss of $1 billion, which was largely attributed to the write-off of unneeded equipment. Revenue for the quarter totaled $3.99 billion as compared with $3.9 billion last year. Both companies said US Sprint's six-month loss of $356 million had a negative influence on their earnings performances.

While neither company will divulge estimated earnings for US Sprint in 1987, Theodore F. Brophy, GTE's chairman and CEO, has said losses are expected to continue throughout the year.

"GTE might suffer even higher losses from US Sprint in 1987 than in 1986," said Robert Wilkes, a senior analyst with New York-based Brown Bros., Harriman and Co.

Jeff Close, a senior analyst with the DMW Group, a consulting firm based in Ann Arbor, Mich., expressed similar worries. "I expect AT&T's prices to come down even lower in 1987," he said.

US Sprint has set network expansion as its top priority for 1987. According to Phil Hermonson, a US Sprint spokesman, the carrier aims to reduce its reliance on AT&T to 9% by year end.

"When we move customers onto our fiber-optic network, it will save us a million dollars a day in leased-line costs," Hermonson said.

Sprint recognizes the obstacles between it and a profitable balance sheet. The company is responding by aggressively targeting the high-profit business market. Hermonson said the current ratio of business to residential customers is one to three, but that Sprint intends the business portion to increase significantly in 1987. The company has already landed many large corporate accounts, including Honeywell, Inc., American Express Co. and F.W. Woolworth Co.

Despite the sobering losses and promise of future meager returns for its parents, analysts favor US Sprint in its race against time. "Sprint has more fiber laid than MCI and offers lower prices. They will prove to be a formidable competitor," Close said.

Wilkes said AT&T's return on services may come in lower than expected and encouraged the company to raise rates. "That will help Sprint's margins immensely."

base software to improve processing efficiency and performance, is the DBMS design component that differentiates the premises local network data base from the work group local net data base.

Many data base developers are working on data base servers for microcomputer local-area networks. The question is whether these new applications will be developed as 16-bit MS-DOS applications or as 32-bit 80386 applications. Currently, developers seem inclined to develop data base servers as MS-DOS applications.

An MS-DOS-type data base server can be a powerful application, given the proper support from the network operating system. It can be run on the 80386 file server as a value-added process that's allocated 640K bytes of dedicated memory.

Major product introductions for the 80386 will occur throughout 1987 and 1988, but 80386-based workstation and network operating systems will be shipping before the end of 1987.

It's a measure of the significance of the 80386 that users may well have true 80386 workstation software while they're still waiting for 80286 workstation operating systems to appear.

down by top management.

Executives are more attentive to proposals from people who have learned to promote their ideas in terms that are meaningful to the business. These technical managers build not only sound arguments but also consensus among their peers. Information technology managers must demonstrate their capabilities and develop credibility.

The survey indicates that users and vendors share some common concerns. One of these is putting to work technology that is consistent with the culture of the organization. Users also face the problem of integrating products from vendors that have competing proprietary designs.

Telecommunications and office systems professionals must recognize these problems and develop strategies to overcome them.

There are no pat answers.

Network and office systems technologies overlap. Solving a particular problem requires the right mix of business and technical skills.

Both users and vendors, respectively, have a responsibility to put together strong teams.

► COMSAT/CONTEL MERGER

Stockholders give nod

BY PAM POWERS
Senior Editor

WASHINGTON, D.C. — Communications Satellite Corp. (COMSAT) and Contel Corp. inched closer to their goal of joining forces last week when shareholders of both organizations voted to approve the companies' proposed merger. But that merger has yet to be blessed by the Federal Communications Commission and other regulatory bodies, and it is expected to meet increasing opposition in coming months.

In separate meetings last week, 86% of voting Contel shareholders and 94% of voting COMSAT shareholders approved the merger plan. Outlined last September, the companies' merger proposal calls for Contel to become a wholly owned subsidiary of COMSAT.

The proposed marriage of the two companies is steeped in controversy stemming from COMSAT's role as U.S. representative to the International Telecommunications Satellite Organization and International Maritime Satellite Organization. As such, COMSAT provides international satellite transmission for U.S. carriers and is regulated by the FCC. The FCC mandates that 48% of all international calls be routed over INTELSAT.

Long-distance carriers are denouncing the merger because they believe Contel would gain unfair advantage as a partner of COMSAT, with the latter's monopolistic hold on U.S. international satellite transmissions. In December, MCI Communications Corp. protested the merger before the U.S. Securities and Exchange Commission. MCI complained that COMSAT cannot both have MCI as a customer and compete directly with it.

An MCI spokesman said the opposition camp has grown more vociferous, and that ultimately Congress may have to intervene.

Separately, the U.S. government nominated Dean Burch to take over as director general of INTELSAT. That post was vacated in December when Richard Colino was suspended because of his role in an unauthorized payment to loan brokers. Burch is a former FCC chairman and was counsel to Presidents Richard Nixon and Gerald Ford. ⚡

in a 500-user survey conducted at the show by Communications Satellite Corp. (see "Users back deregulation," Page 5).

The U.S. Department of Justice recently urged U.S. District Court Judge Harold Greene to allow the BOCs to offer long-distance and information services and manufacture telecommunications gear ("Justice backs BOC bid for freedom," *NW*, Feb. 9). Jim Maretz, voice network services senior engineer with Philadelphia-based Cigna Corp., said he is steadfastly opposed to permitting the BOCs to offer long-distance services and manufacture equipment. "I am very uncomfortable with the idea of the BOCs expanding into other lines of business," he explained. "I think they should stick to providing services over the local loop."

BOC expansion would come at the price of customer service, Maretz maintained. "If the BOCs start new business ventures, they will staff the new groups with the best personnel they have. That would weaken their customer service efforts," he said.

"We need all the help we can get from the BOCs. We need BOC people who are sensitive to the needs of our company," Maretz explained. BOC emphasis on new lines of business could weaken this user-vendor link, he cautioned. Maretz claimed Federal Communications Commission-developed accounting procedures designed to safeguard against cross-subsidization of BOC ventures will prove insufficient.

James Hynes, telecommunications vice-president for the New York-based Chase Manhattan Bank, N.A., said permitting the BOCs to offer long-distance service and to manufacture communications equipment would be a mistake. "Although this might broaden the choices users have for certain services, entrance into new business markets would divert the BOCs' attention from offering local communications services," he predicted.

Dan Lindstrom, data services manager for Marsh & McLennan Companies, Inc., a New York-based insurance company, predicted the BOC's entry into the long-distance market would make choosing a long-haul provider more complicated for users. "Breaking up AT&T in 1984 created enough confusion in the long-distance market," he recalled. "Further deregulation of the BOCs would just add a vast amount of additional confusion to the telecommunications industry."

Lindstrom said the timing of the Department of Justice's proposal to further deregulate the BOCs was poor. "Just when we thought we understood exactly what the BOCs could do for us and had identified who at the BOCs we needed to talk to about services and support, this proposal comes along and tosses everything up in the air."

Robert Mhoon, telecommunications engineering manager for Dallas-based FMC Corp., also warned that further diversification would weaken the BOCs' ability to keep current with the concerns and needs of users. And, Mhoon said, he's already had enough trouble with indifferent long-haul carriers.

"The biggest failure of the telephone companies has been in the area of customer service. Oftentimes, long-distance providers don't respond to a problem until the user threatens to use a transmission facility offered by one of their competitors," Mhoon related.

The telecommunications manager said vendor indifference to FMC's needs has forced the company to acquire fiber-optic transmission facilities from LDX Net, Inc. "The company provides excellent service and is very responsive to our needs," Mhoon said. ⚡

■ Version 4 of Centralized Systems Management (CSM), a set of Unix-based applications that provide users with centralized control of their PBXs and networks. The AT&T 3B2/400 microcomputer has been added to the family of CSM hosts.
■ Audix-S, the latest and smallest addition to AT&T's line of voice mail systems. Audix-S supports up to 1,000 light-volume users. AT&T also announced price reductions for its Audix-L voice mail, which supports as many as 4,000 users, and Audix-M, a voice-mail system that can handle up to 2,000 users.
■ The 3B2 Messaging Server Software, which enables users to design their own departmental messaging systems.
■ AT&T 7406D digital telephone sets. Both five-line sets work with the System 75 and the System 85. The basic version of the sets is priced at $360; a second version with a display costs $550. Both telephone sets are available now. ⚡

Swiss, Austrian, French, Belgian and Australian groups. Member companies include American Express Co., Rank Xerox Ltd. (the UK-based subsidiary of Xerox Corp.), Merrill Lynch & Co., Inc. and Bank of America National Trust & Savings Assn.

INTUG is a watchdog agency monitoring international developments in tariffs, standards, regulation and policy. The group advocates freedom of choice in equipment and services and believes users should be able to attach any equipment, including devices such as multiplexers, to the public net without affecting service.

But despite its successes to date, INTUG has found that change comes slowly, especially in Europe where the group is most active. And because a good deal of INTUG's work involves lobbying for users before telecommunications providers, much of what the group has achieved is intangible, according to John Macri, vice-president and systems director of telecommunications networks at the Bank of America. What influence INTUG has had in shaping providers' plans and policies is often hard to gauge.

Macri was at RCA Corp. when INTUG was founded in 1974 and has watched the organization evolve. "INTUG orchestrated the various European telecommunications associations into one force, whose purpose was to advocate standards like X.25 and ISDN," Macri said. Groups in the U.S. didn't become involved in INTUG until three or four years later. Now, "INTUG makes it easier for users to do business in Europe," he said.

The ICA's delegate to INTUG, Bernard Overeynder, believes INTUG "is becoming increasingly effective. What INTUG brings to ICA is representation of the U.S. user in international forums."

Peter Smith, international telecommunications manager for Reuters Ltd. and vice-chairman of administration at INTUG, described INTUG's goal. "What we want is for the telecommunications agency in each country to be accountable for its policies, so users know what they're allowed to do and how the agency arrived at its positions," Smith said.

"The usual areas of discussion are: Who has the right to put equipment on the circuit, and where does the basic transmission facility end and the customer equipment begin," Smith said.

Although the U.S. has seen dramatic changes in its regulatory climate, Smith added, "a lot of countries have not. You're still bound by archaic regulations governing voice transmission though now you're transmitting data."

In 1979, INTUG became an observing member of the CCITT, meaning its delegation can attend meetings but cannot vote. In chalking up victories, INTUG claims it was able to derail a CCITT recommendation that would have required users to link private nets through public network facilities.

INTUG has done a good job of assessing the implications of CCITT rulings, according to Ken Phillips, vice-president of telecommunications policy for Citicorp and chairman of legislative affairs for the Committee of Corporate Telecommunications Users. INTUG has also battled for users' rights to maintain private networks and have them coexist with X.25 nets, he said.

However, Citicorp "doesn't look to INTUG as our only avenue of change. It's necessary to go beyond INTUG representation on the CCITT," Phillips said. As a result of this view, Citicorp is one of a number of corporations represented on the U.S. delegation to CCITT.

ICA's Overeynder points out that CCITT's work on standards affects all users, even those with networks only in the U.S. He also sees INTUG expanding its influence by organizing an increasing number of conferences between telecommunications providers and users. ⚡

> ## The group advocates freedom of choice in equipment and services.

Calendar

Feb. 19-20, New York — Local Area Networks: Connections for Improved Performance. Also, March 17-18, Chicago; March 26-27, San Francisco; April 1-2, Atlanta. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 23-25, Washington, D.C. — Data Communications: Transforming Theory to Real World Applications. Also, March 2-4, Chicago; March 9-11, Seattle; March 16-18, Detroit; March 23-25, Cambridge, Mass. Contact: Data Communications Institute, 55 Main St., Madison, N.J. 07940.

Feb. 25, New York — Satellite Bypass in the Securities Industry. Contact: Waters Information Services, Inc., P.O. Box 2248, Binghamton, N.Y. 13902.

Feb. 26-27, Denver — Understanding and Selecting Voice Messaging Systems and Maximizing the Potential of Your Voice Messaging System. Also, March 9-10, San Francisco; March 24-25, Washington, D.C.; April 27-28, Boston. Contact: *Business Communications Review*, 950 York Road, Hinsdale, Ill. 60521.

March 2-6, Washington, D.C. — Integrated Telecommunications Systems: Managerial and Technical Solutions for Optimizing Private Networks. Contact: Continuing Engineering Education Program, George Washington University, Washington, D.C. 20052.

March 3-4, Washington, D.C. — Networking the IBM PC, XT, AT and Compatibles. Also, March 10-11, Dallas; March 17-18, Chicago; March 24-25, Cincinnati. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

March 4-6, Columbus, Ohio — Data Communications: A User's Guide for Today's Changing Network Environment. Also, March 11-13, Boston; March 18-20, Milwaukee; March 25-27, Los Angeles. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

March 4-11, Hannover, West Germany — Hannover Fair: CeBIT '87. Contact: Hannover Fairs USA, Inc., P.O. Box 7066, 103 Carnegie Center, Princeton, N.J. 08540.

March 5-6, Boston — Data Communications Network Management. Also, April 30-May 1, Seattle. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

March 9-10, Montreal — Open Systems Interconnection. Also, March 12-13, Boston; March 23-24, Washington, D.C.; March 26-27, Toronto. Contact: Technology Training Corp., Dept. OSI/SNA, P.O. Box 3608, Torrance, Calif. 90510.

March 9-11, Washington, D.C.— VSAT Design, Analysis, and Applications for Data, Voice, and Video Environments. Contact: Continuing Engineering Education Program, George Washington University, Washington, D.C. 20052.

March 9-11, Chicago — Local Communications Systems: Wiring, PBXs, LANs, and Much More. Also, April 6-8, San Francisco; May 11-13, New York; June 15-17, Dallas. Contact: Systems Technology Forum, Suite 150, 10201 Lee Highway, Fairfax, Va. 22030.

March 9-12, Washington, D.C. — Information Systems: Powerful Office Solutions To Maximize Productivity Today. Contact: FOSE '87, Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22341.

March 10-11, Washington, D.C. — Open Network Architecture. Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

March 10-11, San Francisco — Packet Switching Network Principles, Operation, Management, and Applications. Also, March 24-25, Chicago. Contact: X.Concepts Limited, P.O. Box 6116, St. Charles, Mo. 63302.

March 11-12, New York — Understanding ISDN. Also, March 23-24, Chicago. Contact: Telecommunications Research Associates, P.O. Box 1200, Newark, Ill. 60541.

March 11-13, New York — Network Management, Control, and Problem Determination. Contact: *Business Communications Review*, 950 York Road, Hinsdale, Ill. 60521.

March 12-13, Toronto — Managing Your SL-1 Business Telephone System. Contact: Angus TeleManagement Group, Inc., Suite 210, 2175 Sheppard Ave. E., North York, Ontario M2J 1W7.

March 12-13, Denver — Data Communications and Networking for the IBM PC XT/AT and Compatibles. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

HORRELLSCOPES
BY EDWARD HORRELL

In communications today, it takes more than just good business sense to survive; it requires celestial guidance.

The pageant of telecommunications industry stars will have a heavy influence over communications users in the coming months.

A reading of the current alignment of the major industry movers and shakers reveals that substantial changes are afoot. Herewith are Horrellscopes' predictions:

Aries: The representation of the zodiacal beginning is appropriate for Siemens AG.

This West German giant is emulating characteristics of the planet Mars, counterbalancing otherwise weak facets in nature.

Siemens' major weakness in the U.S. — distribution — has been recently turned around by its acquisition of Tel Plus Communications, Inc. This aggressive, quick-moving interconnect company has hit on rough times lately on the financial side. While its acquisition by Siemens certainly strengthens Tel Plus' market position, major changes will be forthcoming as a result.

Watch for short-term layoffs and numerous organizational changes. The charts indicate an eventual change in the relationship between Tel Plus and its former flagship supplier, NEC America, Inc. Watch for Tel Plus to move toward the Siemens product line.

Horrellscopes' forecast: Bye-bye, NEC.

Gemini: The sign of thought and action controls the future of Rolm Corp.'s CBXII architecture. Rolm has been thinking about an architectural change for a long time, and that change will appear soon.

The astral indications are specific here: A new architecture will be introduced by Rolm before the end of this year.

But current Rolm users should not give up the galaxy on the existing Rolm architecture yet. While forward-thinking, Rolm is also practical.

The new architecture, while different from the current one, will retain enough marketing similarities to be of interest to existing users. Watch for a reduction in size and a closer compatibility to Integrated Services Digital Network — the IBM way.

Forget what you have read everywhere else. Horrellscopes is solid on this one.

Horrellscopes' forecast: Introduction of the CBXIII in 1987.

Cancer: Under the rule of the moon, Cancer is endowed with determination and tenacity. Governed by the Crab, Electronic Data Systems Corp. (EDS) and US

Horrell is president of Mitchell & Horrell, Inc., a telecommunications consulting firm in Memphis, Tenn.

Sprint Communications Co. have joined forces to provide a proposal for the General Services Administration Federal Telecommunications System (FTS) 2000.

The position of this team is strong. US Sprint and EDS are in a good position for this $4.5 billion award.

Stargazers should watch their calendars from mid-year 1987. That's when the bid will be in.

Horrellscopes forecast: The EDS/US Sprint duo will be the FTS 2000 winner.

Leo: The sign of a vivid imagination controls the future of integrated voice data terminals (IVDT).

The IVDT market has been sluggish during the last few years. However, confusion among users regarding ISDN, the features and capacities of private branch exchanges and users' continued ambivalence toward local-area networks will result in new interest in terminal devices.

Specifically, Horrellscopes expects a dramatic increase in the popularity of terminals, beginning in the third quarter of this year.

Users will find IVDTs offering levels of sophistication and features that will not require complete PBX replacements.

Taurus: The "bull" never stops when it comes to the introduction of telecommunications legislation.

Great zeal characterizes the intellectual pursuits of Taurus, and the bull sign appears to remain strong.

Sen. Albert Gore of Tennessee is continuing in his zealous efforts to introduce telecommunications legislation and bring more federal intervention to the market.

But the position of the planets indicates that the Tennessee senator's success in this regard is as likely as a posthumous Oscar for Elvis Presley. Don't look for any sudden telecommunications legislation to be passed soon.

The charts indicate, however, that some type of federal intervention will occur in the long term. Horrellscopes will stay tuned to these deregulatory developments as the future unfolds.
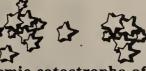
Aquarius: The ruling sign of electronics indicates high results in the T-1 business.

Under its ruling planet, Uranus, Aquarius presages great things for electronics companies that support T-1 transmission.

Specifically, the two companies high on the charts are Network Equipment Technologies Co. (NET) of Redwood City, Calif., and StrataCom, Inc. of Cupertino, Calif.

These companies will continue to lead in the race to use T-1 services in the pre-ISDN era. This prediction becomes especially important as users are "creating" their own

Cosmic catastrophe of the month

With the current emphasis on security in the data communications industry, it is not uncommon for users to overlook the opportunities for eavesdropping on voice telephone calls.

Beginning with service technicians in the equipment room, the number of human ears that could possibly listen in on any given telephone call is potentially large. From the local central and toll offices to the remote central and toll offices, a typical telephone call is not difficult to overhear.

While vendors and operating companies have stringent requirements to protect subscribers from casual eavesdropping, users should take every precaution to ensure security while technicians are on their premises.

Vendors providing maintenance should be reminded of their potential legal liability in the event of casual eavesdropping by their employees.

Much competitive information can be — and is — casually passed along in this way.

ISDN-type services through the use of readily available digital transmissions such as T-1.

As users find that the ISDN wait is not worth enduring, the use of digital T-1 services will become increasingly attractive to telecommunications managers.

Watch for NET and StrataCom to light up the galaxy with their sales performance.

Scorpio: The sign of strong vocabulary and command of the spoken and written word hangs over the area of user documentation.

Scorpios show strength in editorial work and creative writing. Governed by the planet Pluto, Scorpios are endowed with coolness. And what better combination of traits could be combined to control user documentation?

From PBXs to local-area networks, ongoing use of communications equipment is no better than its associated documentation. Currently, the vendor community gets a cumulative D- in this category.

With few exceptions, user documentation is left wanting. Yet its contents are vital during times of problems with the system or when self-maintenance is performed.

Historically, users tend to overlook documentation during the selection process. The glitter of the equipment or system overshadows the importance of the ongoing information required for successful operation of that system.

In other words, users typically discover the weaknesses in documentation too late.

Users should carefully review all documentation early in the selection process. Adequate documentation should be required for the finalists in any selection process. And poor documentation is in itself an adequate reason for eliminating a particular vendor.

It's time for users to get tough regarding the ongoing documentation and information provided for extended use of communications systems.

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